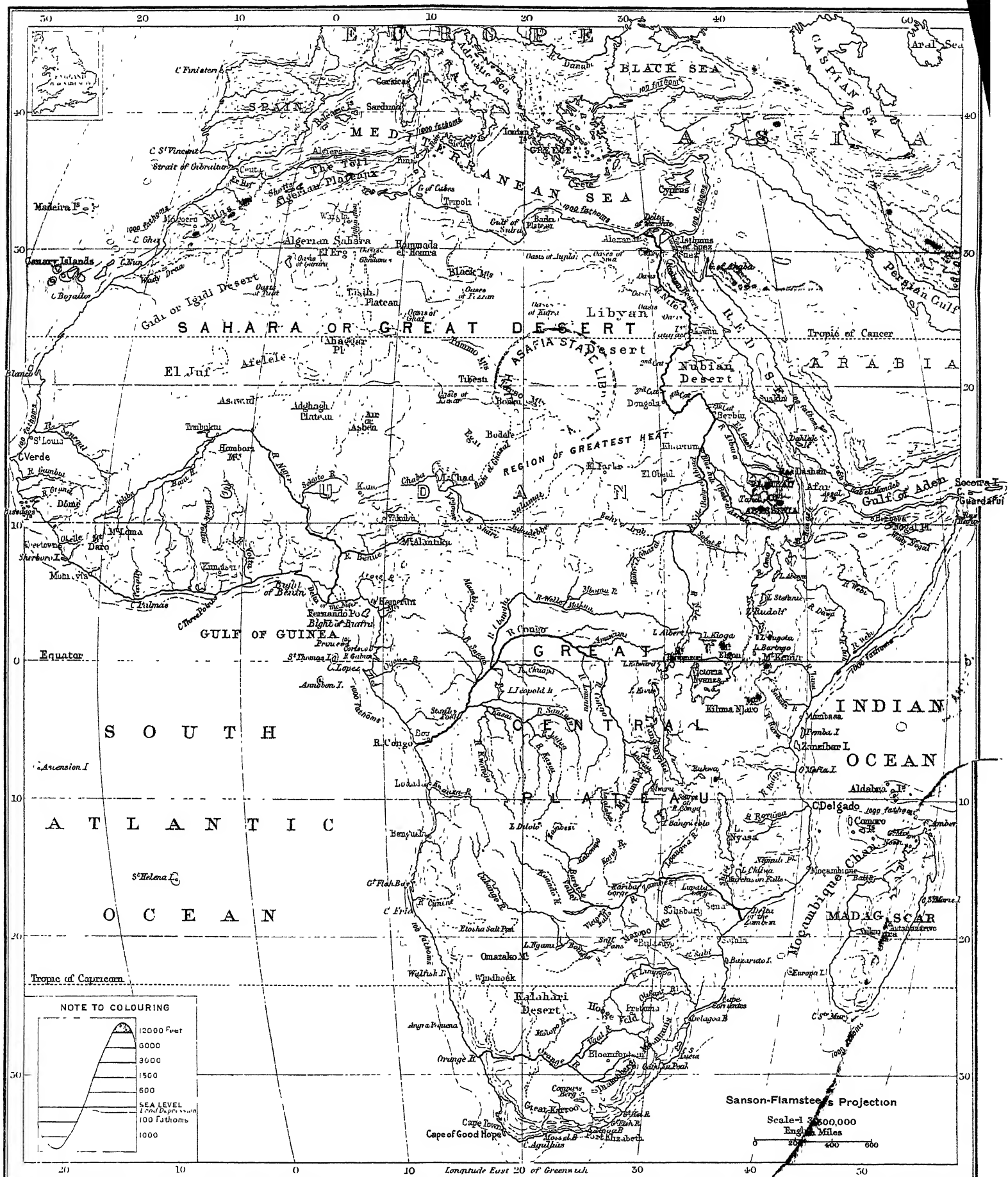


AFRICA - BATHY-OROGRAPHICAL.



THE OXFORD SURVEY OF THE BRITISH EMPIRE

A F R I C A

INCLUDING SOUTH AFRICA, RHODESIA, NYASALAND, BRITISH EAST AFRICA, UGANDA, SOMALILAND, ANGLO-EGYPTIAN SUDAN & EGYPT, GAMBIA, SIERRA LEONE, GOLD COAST, NIGERIA, WOLFISH BAY, WITH MAURITIUS AND OTHER ISLANDS IN THE INDIAN AND ATLANTIC OCEANS.

With 47 Photographs, 5 Coloured Maps, and 40 Figures in text

Edited by

A. J. HERBERTSON, M.A., PH.D

Professor of Geography in the University of Oxford

and

O. J. R. HOWARTH, M.A.

Assistant Secretary of the British Association for the Advancement
of Science

O X F O R D
AT THE CLARENDON PRESS

1914

PREFACE

THE object of this series is to furnish a survey of the British Empire and its constituent parts in their geographical and allied aspects, together with their economic, administrative, and social conditions, at the present time. History has not been included as an integral part of the scheme, except for the inclusion of a general historical summary in the General Volume; for the rest, historical references have been included only in so far as they were found desirable for the explanation of existing conditions. The history of the Empire has been brought under review elsewhere, notably in the *Oxford Historical Geography* edited by Sir Charles Lucas.

The series is in six volumes, and the subject-matter is thus distributed :

- I. The British Isles and Mediterranean territories (Gibraltar, Malta, Cyprus).
- II. Asiatic territories.
- III. African territories (with adjacent islands, Mauritius, &c., St. Helena, Ascension, and Tristan da Cunha).
- IV. American territories (with the Falkland Islands and dependencies).
- V. Australasian territories (including islands in the Pacific Ocean and the British sector in Antarctica).
- VI. General.

The Editors have been in close consultation throughout as to the general plan and details of the work. They have shared between them the arrangements with the contributors, for whose collaboration they express their thanks. They wish in particular to record the generous assistance afforded by the late High Commissioner for South Africa, Sir Richard Solomon ; the special interest which he showed in the section on South Africa only adds to their regret that he did not live to see the work completed.

Professor Herbertson has undertaken the major part of the work connected with the maps ; Mr. Howarth has carried out the greater part of the editorial work in its later stages, has dealt with the illustrations (in the five topographical volumes), and has seen the volumes through the press.

It is desired to acknowledge Mrs. Howarth's collaboration in the work of indexing, and Mr. O. Brilliant's assistance in the compilation of the gazetteer references in the topographical volumes.

Notes in the text enclosed in square brackets are editorial.

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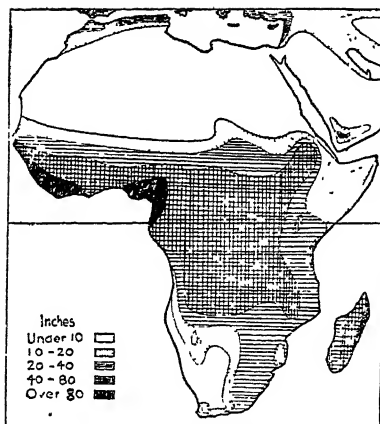


FIG. 1. Mean Annual Rainfall of Africa.

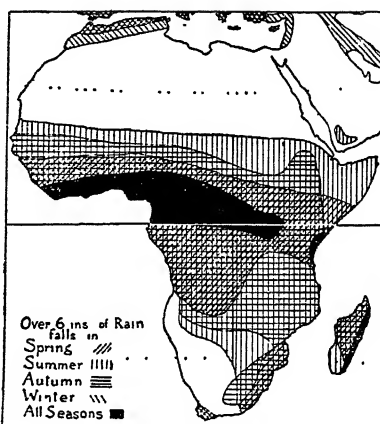


FIG. 2. Rainy Seasons in Africa.

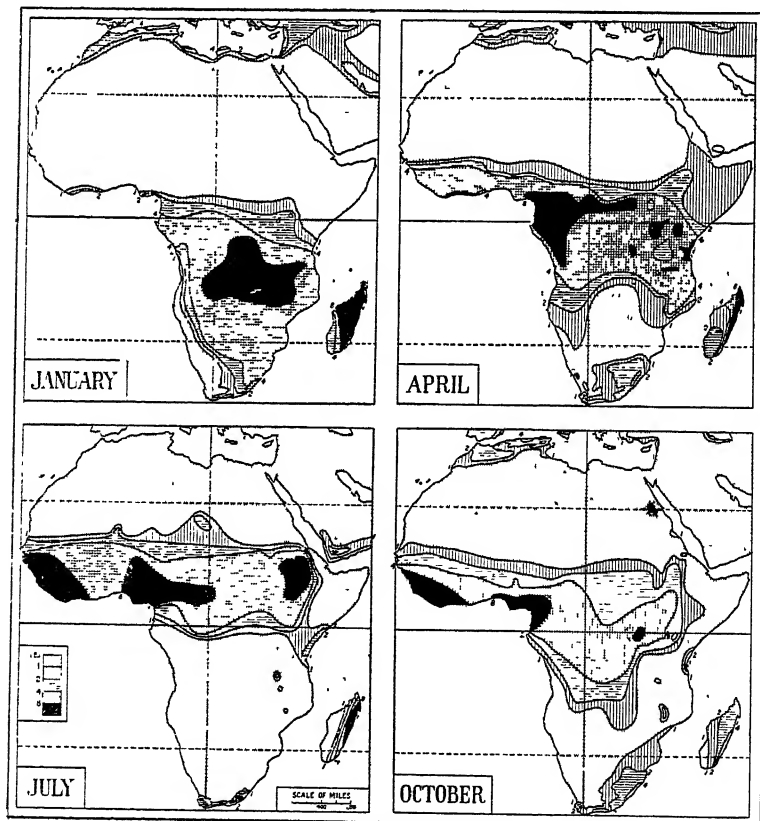


FIG. 3. Seasonal Rainfall.

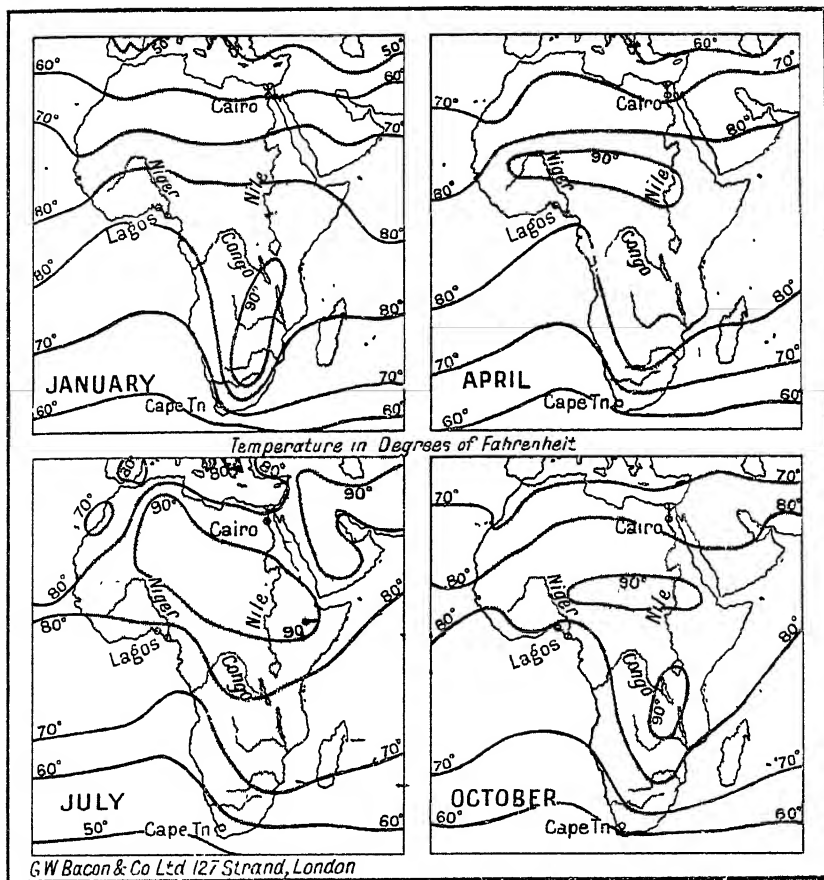


FIG. 4. Temperature. (Maps showing pressure over the African continent will be found on page 328.)

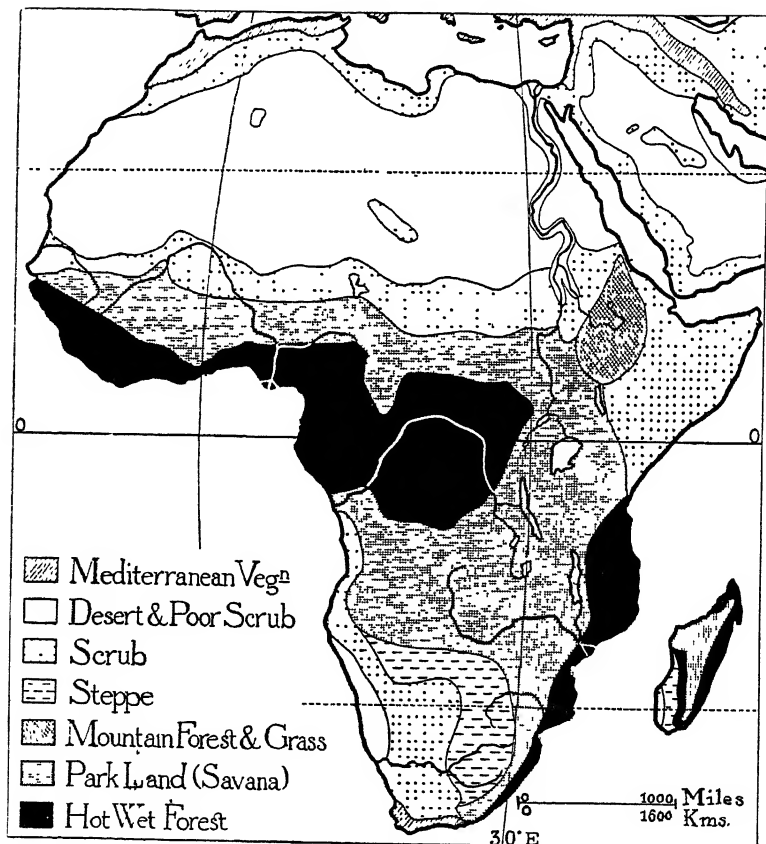
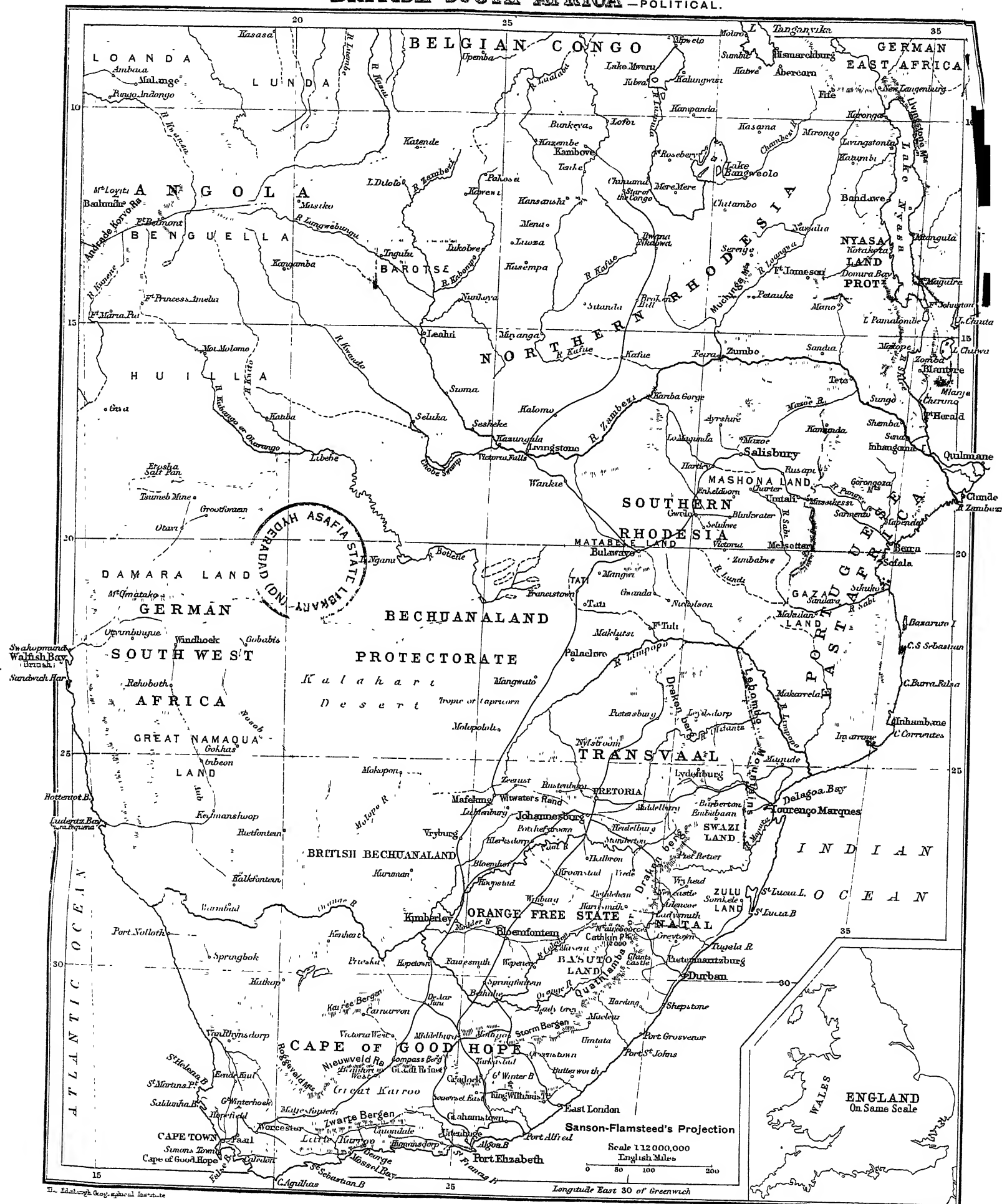


FIG. 5. Vegetation Regions of Africa.

BRITISH SOUTH AFRICA — POLITICAL.



SOUTH AFRICA

INTRODUCTION

THE term 'South Africa', so far as concerns British Africa territory, is used in more than one connexion, and with south of Lake Tanganyika. more than one connotation, and as, in the chapters which follow, one or another of these connotations has been adopted according to the requirements of the particular subject under discussion, it is well at the outset briefly to explain the political division of the whole of British African territory southward of Lake Tanganyika.

To that territory the name of British South Africa may be applied in a proper geographical sense, and it is so applied, for physical reasons which will be obvious, in the following survey of the physical geography and geology (chapter I). Its area approximates to 1,205,000 square miles, and it lies between latitudes 8° and 35° S. It marches on the north with German East Africa and Belgian Congo, on the east with Portuguese East Africa, and on the west with Angola (Portuguese territory) and German South-west Africa. Bordering it on the north-east, but not geographically reckoned with it, is the Protectorate of Nyasaland (formerly called the British Central Africa Protectorate). Only from latitude 27° S. southward does British South Africa possess a sea-board, extending from the Atlantic to the Indian Ocean : it therefore resembles a vast wedge driven inland into the continent from the south.

In a limited, still physical, sense, South Africa is frequently reckoned as that part of the continent which lies south of the river Zambezi, and it is so regarded for the purposes of the study of climate in chapter II. But this division conflicts with the political, for the British South Africa Chartered Company's territory of Rhodesia, which forms the northern third (or rather more) of British South Africa in its widest sense, strikes athwart the great South of rivers Zambezi and Limpopo.

river, which divides it into Northern and Southern Divisions. South of Rhodesia and the Limpopo River lie that congeries of colonies which are now united as the Union of South Africa—Transvaal, the Orange Free State, Natal, and the Cape of Good Hope. In addition there are certain territories which lie outside the Union but within the jurisdiction of the High Commissioner for South Africa; these are the Bechuanaland Protectorate, Basutoland, and Swaziland. To these three territories separate chapters have not been devoted; their names find natural though incidental places alongside those of the divisions of the Union: for Rhodesia, however, in spite of its inclusion in the physical survey of the sub-continent, separate treatment is clearly essential (chapter IX).

CHAPTER I

PHYSICAL GEOGRAPHY AND GEOLOGY

By A. W. ROGERS

BRITISH SOUTH AFRICA stretches through 27° of latitude from the Cape to the southern end of Lake Tanganyika. ^{General physical features.} It is a high-lying country, for only narrow belts along the coast are under 1,500 feet in altitude, yet there are no great mountain ranges in it. The highest points are in the south-east, on the Drakensberg, where the edge of the eastern escarpment reaches 10,600 feet in places. The only mountains of the folded type which attain a height of 7,000 feet are the southern ranges of the Cape Province.

The most important feature of the sub-continent is the ^{Interior plateau.} interior plateau ; very extensive areas on it are flat or are diversified only by the worn remnants of hills which rise more or less abruptly from its surface. The northern part of the plateau includes Rhodesia and Nyasaland, made of Archaean rocks covered in part by deposits of continental origin correlated with some portion of the Karroo system ; in the north-east this plateau was broken up in late geological times by the remarkable faults which gave rise to the troughs in which Tanganyika and Nyasaland lie, and the formation of which was accompanied by volcanic activity that still persists further north.

The Archaean rocks of the great Central African plateau extend southwards into the Union, where they become covered by thicker and thicker deposits of sedimentary rocks towards the south, but the surface maintains its tableland character over the newer rocks.

A very important feature in the great tract of country ^{Kalahari.} thus briefly described is the Kalahari, a sand-covered region of little relief, and in part of internal drainage, which extends from the Congo-Zambezi watershed to the Orange River. The Zambezi drains its northern portion,

and formerly that river received tributaries from a part at least of the middle Kalahari, and the Orange River used to receive water from the southern Kalahari, but at the present time no water leaves the middle or southern Kalahari except by evaporation.

The political boundaries have for the most part been drawn without reference to the physical features; for some 400 miles the slightly marked Congo-Zambezi watershed is the limit of Northern Rhodesia, but the Luapula and lower course of the Orange are the only other definite features which have become international boundaries south of Nyasa. Within British South Africa the escarpment of the southern Drakensberg, and the Molopo, Vaal, Orange, and Limpopo Rivers are the chief features which serve as territorial limits.

The South African Plateau: Its Escarpment and Rivers

The southern end of the African plateau, on which the Bechuanaland Protectorate and by far the greater part of the Union lie, rises gradually to the north and south from the valley of the Orange River. On the east, west, and south the plateau is bounded by a great curved escarpment. Both on the east and west (as far south as Van Rhyn's Dorp) the escarpment is separated from the ocean by a terraced country or by slopes of a more uniform grade, but in the south the Great Karroo and long ranges of fold-mountains intervene between the escarpment and the coast.

The
eastern
escarp-
ment.

The eastern escarpment is, on the average, higher than the western by some 3,000 feet. It commences as a definite feature as far south as the Strydpoort range (6,000 feet) near Potgietersrust, while the western escarpment is continued north of the Orange River through German territory into Angola. This difference is to be explained partly by the structure of the two areas, but chiefly by the contrast in climate, the great development of the eastern river system of the Limpopo being due to the heavier rainfall on that side of the continent.

The escarpment of the Strydpoort range at first trends

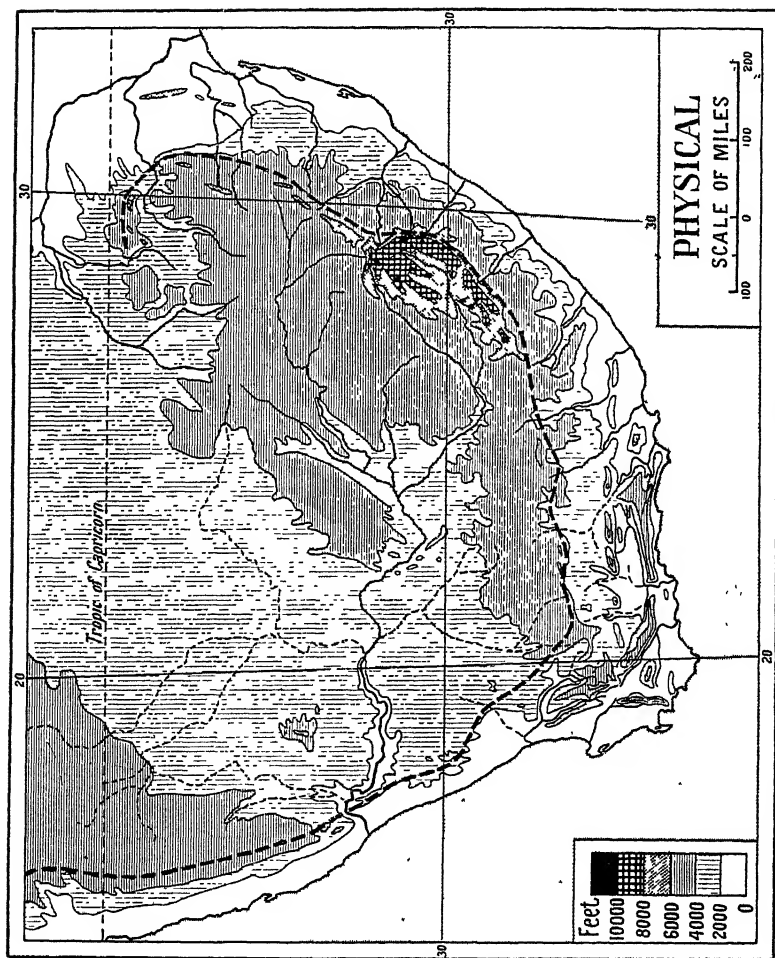


FIG. 6. South Africa, map of surface-relief.

eastwards, but turns south-east at Wolkberg (6,890 feet) and then south to the west of Leydsdorp, where it is called the Drakensberg; the highest point in the Transvaal, Mount Anderson (7,790 feet), stands near its edge. Southwards the Drakensberg of the Transvaal is separated from the Natal Drakensberg by a tract of country between Carolina and Vryheid in which the descent to the low country is more gradual. This change in the nature of the slope takes place where the geological structure of the country alters. The Transvaal Drakensberg is characterized by great cliffs due to the resistant quartzitic beds of the Black Reef series, but as that formation thins southwards the cliffs become lower, and the Archaean gneisses and schists below the Black Reef form the greater part of the slope down to the low country; west of Swaziland the base of the Karroo system, which overlaps the Transvaal formation in that region and comes to lie directly on the Archaean, appears at the top of the escarpment, and the higher beds of the Karroo system take a continually increasing part in the face of the escarpment as it is followed southwards. In this quarter, also, the conditions are complicated by a gentle monoclinical fold affecting the Karroo beds, by which the latter are carried down below the Cretaceous rocks of the coast belt. Further north the greater part of the flexure which connected the sea-ward dipping Karroo beds of the Lebombo range with similar strata on the High Veld has been removed by denudation.

The escarpment becomes more and more marked in northern Natal, and the beds of which it is made belong to the higher subdivisions of the Karroo system, so that for about 280 miles—from the sources of the Tugela south-westwards to the mountains south-west of Barkly East, where the Drakensberg ceases—the highest parts are made of the uppermost (Drakensberg or volcanic) group of the Karroo system; the height of the steep slopes and precipices in this region may amount to 6,000 feet.

The
southern
escarp-
ment.

From the south-western end of the Drakensberg, the escarpment, somewhat diminished in height, has

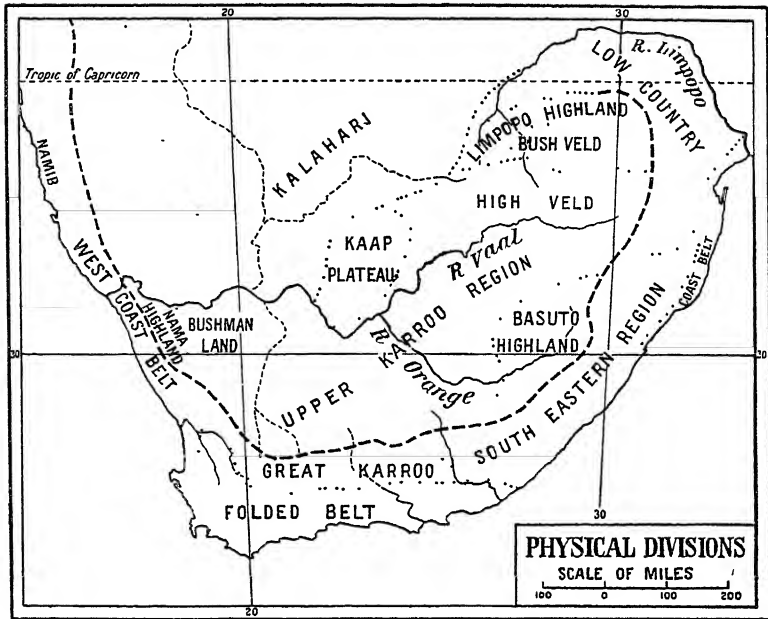


FIG. 7. Physical Divisions of Africa south of the Limpopo.

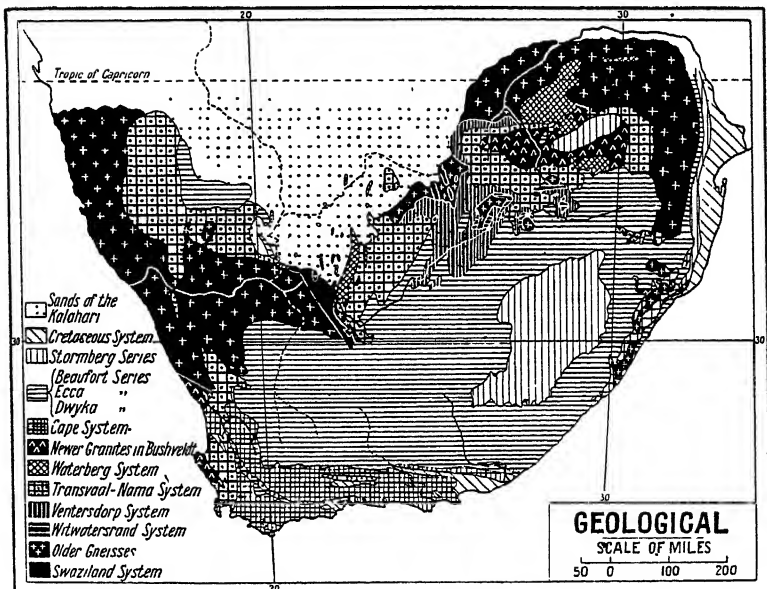


FIG. 8. Geology.

a westerly course for some 400 miles under different names, Stormberg, Sneeuwberg, Nieuweveld, Komsberg, in successive parts. The escarpment in this portion of its course is cut out of lower and lower beds of the Karroo system, the Komsberg region consisting of the lower stages of the Beaufort series. From this district it turns north-west, where it bounds the Roggeveld, and continues to be cut in lower beds, so that the basal Beaufort beds only form a capping to the Ecca in the escarpment south of Calvinia. From the Sneeuwberg to the Roggeveld the escarpment presents a front varying in height up to 3,500 feet to the Great Karroo or Gouph, and where the latter comes to an end, about the latitude of Van Rhyn's Dorp, the escarpment is double, with a terrace between the two steps.

The
western
escarp-
ment.

West of Calvinia there is again only one step, owing to the progressive disappearance northwards, by denudation, of the strata forming the Roggeveld. The escarpment thus comes to be formed of the lowest Karroo beds (Dwyka), part of the Cape system, and the Nama formation lying unconformably below the latter. North of Stinkfontein Poort in Van Rhyn's Dorp the Cape system has completely disappeared, and for some miles the Dwyka caps steep slopes of the Nama beds, but the latter give place to Archaean gneiss south of the Langeberg, a Dwyka-capped spur on the edge of the interior plateau. North-west of the Langeberg the escarpment consists entirely of gneiss for some 60 miles round the southern and western sides of Kamiesberg, which is a western, highly dissected projection of the interior plateau (called Bushmanland in this region). From Kamiesberg north-westwards for some 90 miles the escarpment of gneiss is much cut up, but north of the Buffel's River it again becomes a definite feature for some 30 miles, where the quartzitic basement beds of the Nama system form its summit. From the neighbourhood of Klipfontein north-westwards to the Orange River the conditions are complicated by the presence of steep valleys leading to that river, and the escarpment



FIG. 9. Section from S. to N. through northern Orange Free State and the Rand, thence N.E. through Transvaal.

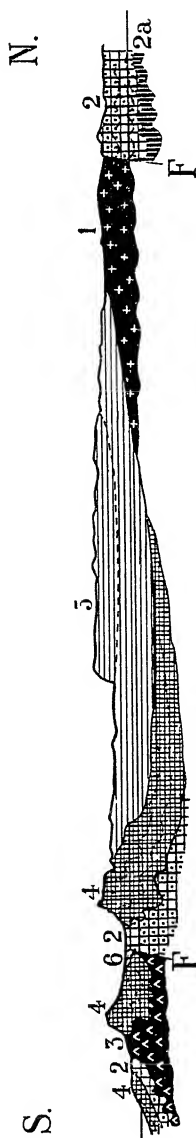


FIG. 10. Section from S. to N. approximately on 20° E. long.



FIG. 11. Section through Cape, Karroo, and Swaziland systems.

almost disappears as a definite feature, but in German territory it again becomes important in the structure of the country.

The whole
escarp-
ment.

It is noteworthy that the escarpment becomes more precipitous where thick horizontal beds of resistant rock co-exist with softer beds, as in the Transvaal Drakensberg (Black Reef), Natal Drakensberg (volcanic series and Cave sandstones), Nieuweveld and Roggeveld (intrusive sills of dolerite), and the Bokkeveld Mountain (Table Mountain sandstone); and that where it is cut in more homogeneous rocks, such as the gneiss of Kamiesberg, it is deeply and irregularly dissected.

Though there are still uncertainties about the structure of parts of this curved escarpment, the length of which within the Union is over 1,300 miles, it is one of the great features of the country, and its geological structure is broadly symmetrical; on each side of the continent the northern portion is capped by the correlated Transvaal and Nama beds; to the south, on each side, come intervals of more broken country of Archaean rocks, and further south the Karroo formation appears and forms an increasing part of the escarpment and eventually the whole of it. The chief defects in symmetry are due to the absence of the Cape system from the escarpment in the east and the great development of the Karroo formation on the same side, and also to the north-western extension of the Great Karroo. A corresponding asymmetry is found in the structure of the coast belt, which will be described later.

The main
divide.

For some 650 miles, from the neighbourhood of Carolina to the Komsberg, the main watershed of the country, between rivers flowing to the Indian Ocean and those going to the Atlantic, lies on the escarpment. Near Carolina the watershed leaves the escarpment and takes a westerly course over the High Veld and the Witwatersrand, then turns north-west, passing between Zeecrust and Mafeking into the Protectorate. From the Komsberg it runs south-west across the Klein Roggeveld and the Great Karroo to the Bokkeveld and the Cape peninsula.

The Limpopo receives the drainage of the northern and middle Transvaal either by gorges cut back through the escarpment, as in the case of its tributary the Oliphant's River, or, higher up its course, by the Magalakwin, Crocodile, and other rivers which flow northwards from the country west of the Strydpoort range where the escarpment comes to an end. Between Potgietersrust and Haenertsburg the rivers rise on the Archaean rocks north (i.e. below the face) of the escarpment, pass through it by great 'poorts' such as those of the Clunie's and Malip's Rivers, and after traversing the highly dissected country enclosed by its north-eastern bend, in which they join to form the Olifant's River, again break through the escarpment on their way to the low country. Instances have been described of the capture of the head-waters of these streams by the rivers with steeper grades and more direct courses to the Limpopo; these facts, in conjunction with the geological structure of the country, prove that the escarpment formerly extended far to the north of its present position.

South of the Witwatersrand the whole country enclosed by the escarpment, with the exception of a small area in Calvinia and Namaqualand, is the drainage basin of the Orange River. The main stream of that river and the southern tributaries of the Vaal rise in the Basuto Highlands, where they have cut deep valleys in the uppermost strata of the Karroo system. The Vaal River has a more varied course than the corresponding part of the Orange, because it traverses the hilly country made of pre-Karroo rocks round Parys and Venterskroon while the Orange River leaves the Karroo beds first near Hopetown, and only reaches hilly country made of the older rocks at Prieska. The chief northern affluent of the Vaal is the Hart's River, which is joined by the Dry Hart's at Taungs. The Dry Hart's, Hart's, Vaal, and Orange Rivers, over a distance of 230 miles from Vryburg to Prieska, occupy the course of an ancient pre-Karroo valley, to which the name Kaap valley has been given on account of its relation to the escarpment of the Kaap plateau to

the east. The Dry Hart's and the Hart's valleys have a peculiar feature in that they are much less steeply graded for many miles above their junctions with the larger Hart's and Vaal respectively than the valleys of the latter; this is due to the circumstance that the tributaries are on the comparatively soft Karroo beds which filled the Kaap valley, while the large rivers, above the junctions, are on the hard pre-Karroo rocks on the left side of the Kaap valley. The old Kaap valley pursued a southerly course east of Prieska and is lost to sight under the Karroo formation, but the Orange River leaves this ancient valley and turns north-west for some 120 miles and then flows westwards to the Atlantic. From Prieska to the confluence of the Hartebeest River, the valley of the Orange is alternately very steep-sided and narrow and more open, but even in the open portions the river itself is some 20 or 30 feet below the ground near it, except in times of great flood, as is also the case in the higher part of its course. There are only very narrow strips of alluvium along the river. Below the junction of the Hartebeest, the Orange River, which in that region is much divided by islands, drops more than 400 feet over the Ougrabies Falls, and for many miles below them it flows in a deep gorge with precipitous walls. Near its mouth the river makes a sharp curve, convex to the north, through the mountainous country of the Richtersveld, and enters the Atlantic after a short course through the coastal sand-veld and over a sand bar. From the confluence of the Orange and Vaal to the Atlantic, a distance of over 800 miles, there are only two tributaries of considerable length by which water occasionally reaches the main stream; they are the Brak and Hartebeest Rivers, which together drain some 56,000 square miles of the extreme southern part of the South African plateau. The tributary from the north, the Hygap, formed by the junction of the Nossob, Molopo, and Kuruman Rivers, drains over 60,000 square miles in Bechuanaland and German territory, but its course is blocked by sand dunes, and the small quantity of water

occasionally carried by it comes from the country a few miles above its mouth.

The Hartebeest River is the largest tributary from the south ; it is formed by the junction of the Fish, Zak, and Olifant's Vley Rivers some 70 miles above its mouth, draining the Roggeveld, Nieuweveld, and Karreeberg regions. This group of rivers presents the peculiar feature of a more steeply graded lower course (the Hartebeest) and a very flat middle course. The change takes place where the rivers leave the flat-bedded and comparatively soft Karroo beds and flow over the hard gneiss and schists of Kenhardt. They have evidently widened their valleys in the softer strata behind the more resistant Archaean rocks, in which the valley is narrow. The Hartebeest is a periodical river with less frequent floods than the Orange, which controls the level of the mouth of the Hartebeest, so that the latter is maintained in a favourable condition for cutting down its bed. The tributaries of the Hartebeest for many miles above the Archaean outcrops have lengths of very flat valleys on soft rocks between shorter, narrower, and more steeply graded courses over hard dolerites. In the flat stretches there is often no definite bed, and the water in flood-time spreads over the valley floor for some miles on either side of the middle of the depression. These sheets of water are only a few inches deep, but the flats take up so much of the water that the Hartebeest rarely receives any from the Zak River.

The sub-regions of the South African Plateau

The interior plateau can be divided into nine sub-regions, each of which, with the possible exception of the Kalahari and Bushmanland, presents features that distinguish it from the others, though there are of course transitional belts from one to another. The sub-regions are the Kalahari, the Kaap Plateau, the Limpopo Highlands, the Bushveld, Highveld of the Transvaal, the Basuto Highlands, the Upper Karroo, Bushmanland, and the Namaqua Highlands.

The
Kalahari.

The portion of the Kalahari which comes within the scope of this chapter includes the Bechuanaland Protectorate, the Gordonia district, and parts of Kuruman and Hay. It lies between 2,700 and 5,000 feet above sea-level. Its chief characteristic is the almost universal covering of reddish sand, which is for the most part arranged in long dunes lying generally west-north-west, joining each other at intervals. The dunes are rarely in a condition to move under present circumstances, for the sand supports a fairly thick growth of grass, and occasionally bush. It is a mistake to call the country a desert, for it has very little in common with such regions as the Libyan Desert or the deserts of Tibet. Over large areas dunes cannot be distinguished, and the sand forms an undulating surface. Along the rivers the sand-dunes lie parallel to the beds, and they are often conspicuously developed on the south and east sides of pans; in these cases the dunes are usually almost devoid of vegetation, and they are pale yellow or almost white owing to the removal of the usual ferruginous coating of the sand grains when lying in the occasionally wet pans and river beds before the wind carries them on to the banks.

No water leaves this region by the surface of the river channels. The rain is quickly absorbed by the sand, and the evaporation from the pans and occasional sheets of water in the rivers is intense. There is a general underground flow of water below the surface of the dry river beds, as shown by the results of well-digging in them; and below pans there is often a water-supply that can be got by means of wells; in the Kalahari generally the rainfall appears to be sufficient only to moisten a layer of sand of varying thickness, but not to saturate it so that water can collect in wells. In the south-western corner, from Rietfontein to the Orange River, the covering of sand is less general than usual, and in this hard-veld there are many water-yielding wells.

Pans, usually slight depressions in the surface with floors of sandy mud, tufaceous limestone, or the bed-rock

of the neighbourhood, are especially abundant in the south-western part of the region. The largest, Haakschien Vley, has an area of about 80 square miles and a flat floor of hard sandy mud with occasional flat patches of the underlying rock. In the eastern part of the region, especially where the Kalahari conditions encroach on the limestone country of the Kaap plateau, the pan-floors are of calcareous tufa, and to the east of the Heuning Vley ridge the upper part of the calcareous tufa is more or less silicified. Limestone pans are very numerous in the middle Kalahari. Though the wind is certainly the agent by which the sand is removed from these depressions, much evidence has been put forward to prove that certain pans which are small and steep-sided, and depressions within many other pans, have been enlarged, possibly also initiated, by the large game which formerly resorted to them to drink or wallow.

There are few hills in the Kalahari ; the largest are those in the extreme south, such as Scheur Berg and Inkruij. They are all of the 'Inselberg' type, rising very steeply from the undulating sand-veld.

Over a very large area of the southern Kalahari the sand appears, from the evidence of wells, to lie directly upon the Dwyka series, but to the west the older rocks of the Nama system and Archaean gneiss are laid bare in places ; on the east the Matsap series forms the ranges on the borders of the Kalahari and the Kaap plateau, and the Kheis rocks (quartzites and schists) appear in the Scheur Berg.

This region lies between the Kalahari on the west and the eastern escarpment (Campbell Rand), overlooking the long valley (the old Kaap valley) now occupied by the Dry Hart's, Hart's, Vaal, and Orange Rivers. The main features in it are the wide limestone plain in the east, which rises from 4,000 feet on the top of the escarpment to 5,000 in the country between Kuruman and Daniel's Kuil, and the mountain ranges on the borders of the Kalahari, which rise to a height of 6,010 feet (Langeberg Beacon). The country east of the Asbestos Hills is drained

The Kaap
plateau.

eastwards into the Vaal and Orange Rivers north of Prieska, the western and northern parts directly into the Orange River west of Prieska or into the Kalahari ; the rivers very rarely have water at the surface, though there is an underground flow in many cases. The eastern plateau is at the most 80 miles wide, between Taungs and Kuruman ; it becomes narrower to the north and south. Though the rivers on this plateau are dry there is a comparatively abundant water-supply in springs and holes ; the Kuruman spring (4,000,000 to 5,000,000 gallons a day) is one of the largest springs in South Africa. Deep clefts and small caves, empty or filled with débris, are numerous on this limestone plain. In the long range of the Asbestos-Kuruman-Heuning Vley Hills the westward-dipping Griquatown beds form an escarpment which rises to 6,090 feet between Kuruman and Daniel's Kuil. Towards the north they disappear under the sand of the Kalahari ; in the south, across the Orange River, they are continued as the Doornbergen in Prieska. The trend at the south end is towards the north-east, but it turns northwards at Daniel's Kuil, north-westwards near Kuruman, and northwards again where the Kuruman River passes through the range. A similar but less marked curve is followed by the Langeberg range to the west, and the Korannabergen form a north-south range further west. The Korannabergen and Langeberg are the smooth-topped remnants of a strongly folded mountain region made almost entirely of the Matsap series. They are steep-sided and rise abruptly from flat sand-covered country of the Kalahari type. Between the Langeberg and the Asbestos-Kuruman Hills there is undulating country, hard-veld in the south but covered with sand in the west and north. The major portion of the denudation which shaped the Langeberg district, the Asbestos-Kuruman Hills and the Campbell Rand, is of Dwyka or pre-Dwyka date, for outliers of the flat-lying Dwyka are found in the southern and eastern parts where the surface-relief of the pre-Karoo rocks is greatest.

The Limpopo Highveld is the rather elevated, much dissected country between the Bushveld and the Limpopo valley. It is traversed by the rivers from the central Transvaal, the Steelpoort, Olifant's, Magalakwin, Marico, and the upper part of the Limpopo itself. Its eastern portion is the northern section of the Transvaal Drakensberg, described in a previous paragraph, and the country behind the escarpment; the middle part is the Palala plateau in the Waterberg district, a rugged tableland made of flat-lying quartzitic beds of the Waterberg system; the western part, like the eastern, is largely made of southerly inclined beds of the Transvaal system, but here there is no marked escarpment at the northern limit of the formation. The Zoutpansbergen can be regarded as a detached portion of this region; they rise on the southern flank of the Limpopo valley and consist of three parallel ranges of Waterberg beds with escarpments due to strike faults along which the beds are thrown down to the south.

The
Limpopo
Highveld.

The Bushveld is an undulating, sandy country covered with grass and bush, lying between 3,300 and 4,000 feet above sea-level in the middle of the Transvaal. It is for the most part directly underlain by rocks of the Bushveld Plutonic Complex, the interior of a great laccolite laid bare by denudation; but there are many outliers of the Karroo formation on its surface, the largest being that which stretches from near Pienaar's River station for some 100 miles to the east-north-east, forming remarkably flat country called the Springbok Flats. These outliers consist of shales and sandstones, occasionally coal-bearing but of uncertain horizon, at the base, overlain by the massive Bushveld sandstone, the northern equivalent of the Cave sandstone, which is in its turn covered by volcanic rocks of basaltic type correlated with the Drakensberg lavas. At a few places, such as Buiskop near Warm Baths, the Bushveld sandstone makes outcrops which remind one of the Cave sandstone of Basutoland and Griqualand East. The hilly country of the Magaliesberg and Pretoria forms a transition belt from the Bush-

The
Bushveld.

veld to the Transvaal Highveld. It is chiefly made of the Pretoria series dipping northwards under the Bushveld laccolite, of which that series apparently forms the floor. Towards the west the outcrop of the Pretoria series sweeps round northwards through Zeerust and Marico into the Limpopo Highveld.

The
Transvaal
Highveld.

The Transvaal Highveld includes the Witwatersrand and the whole of the Southern Transvaal. It ranges from 4,000 to over 6,000 feet in height, and is the most populous and important part of the province. The surface is undulating, with occasional ridges of moderate height, such as the Witwatersrand, Gats Rand, and Zuikerbosch Rand. On the east the surface is occupied by beds belonging to the lower part of the Karroo formation as developed in the Transvaal ; they lie horizontally and contain the chief coal beds in the province. To the west of the Karroo area there is an anticline of the Transvaal formation trending east and west, flanked both to north and south by synclines. Where the Transvaal formation has been denuded away, the older rocks exposed are the volcanic rocks of the Ventersdorp system underlain by the beds containing the gold-bearing conglomerates on which the prosperity of the Union chiefly rests at the present time. The Archæan gneisses appear beneath the Witwatersrand beds and form the floor on which the latter were deposited in this region. West of Potchefstroom the anticline widens rapidly and becomes lost in a very low, flat, dome-like structure, the interior of which forms the country between Klerksdorp, Vryburg, Lichtenburg and the Vaal River, and is made of the Ventersdorp beds lying on Archæan gneiss. On the south-east the horizontal Karroo beds cover the older rocks ; to the north-west lies the Protectorate of which the structure is not yet known ; the Transvaal formation dips gently to the west to form the Kaap plateau, and to the south-west is the old Kaap valley, still partly filled with Karroo rocks. In the Bloemhof and Wolmaranstad districts there are extensive plains bordering the Vaal River and cut, to a great extent at least, in the lavas of

the Ventersdorp system. In this region, as is also the case further down the Vaal River in Barkly West, there are wide deposits of gravel at various heights above the river which yield diamonds, and are the site of the 'River Diggings'.

The Basuto Highlands stretch from the south-eastern corner of the Orange Free State to the Barkly East district, and include the whole of Basutoland. The country ranges from 5,000 to over 10,000 feet above sea-level, and it is the most mountainous part of South Africa, though the rocks lie almost flat. The mountainous character of the country is due to the ranges of very steep-sided hills left standing between the valleys leading to the Indian Ocean and those draining into the Orange River; the escarpment ranges are called the Drakensbergen, and the great spurs running west and south between the larger head-streams of the Orange River system are known as the Malutis. The whole country is carved out of the uppermost or Stormberg series of the Karroo system, and the mountains are made of the two highest subdivisions of that series, the massive, pale-coloured Cave sandstone below and the dark volcanic beds above. These two groups, so different in colour, give a characteristic appearance to the deep valleys between the ridges and tablelands, and the whole area offers a strange contrast to the very flat portion of the Transvaal Bushveld, the Springbok Flats, made of the same two groups of rock. Though the volcanic beds are probably much thicker in Basutoland, where they attain a thickness of 4,000 feet or more, than in the Bushveld, the striking difference in the scenery is due to the conditions in the two areas. In the Bushveld the rivers have to pass through the hard rocks of the Limpopo Highlands before reaching lower country, and are not able to cut down their valleys sufficiently quickly to dissect the Stormberg beds of the Springbok Flats, but the rivers which drain the Basuto Highlands have very steep grades. The actual difference in level between the base of the volcanic beds in Basutoland and the same horizon in the Bushveld is probably

The
Basuto
High-
lands.

not more than 2,000 feet on the average, but how much of this difference is due to a subsequent uplift of the Basutoland area, and how much to an original difference in altitude at the time of the outpouring of the lavas is not known. The Basuto Highlands are a very healthy grass country for farm stock. The rainfall is fairly high (34 inches) and is little subject to the violent fluctuations which are the trouble in the lower country to the north and west. The lower valleys are largely under cultivation.

The
Upper
Karoo
or High
Veld.

The Upper Karroo includes almost the whole of the Orange Free State, the south-eastern part of Griqualand West, and that part of the Cape Province which lies between the escarpment, the Orange River, and Bushmanland. With the exception of those parts of Kenhardt and Prieska districts which are on the Archaean rocks, this sub-region has a very uniform type of scenery. Wide plains broken by table-shaped hills and 'spitz-kops' (pointed conical hills) are the usual features. Towards the main watershed the valleys become narrower and the tablelands increase in area. The country is made of flat-lying shales and sandstones penetrated by dykes and sheets of dolerites; the dolerites and sandstones are the more resistant rocks, and their outcrops give rise to the outstanding features in the landscape. The dolerite sheets, like the sandstones, form prominent cliffs on the steep slopes and protect the rock below them; they are the cause of most of the precipices on the face of the great escarpment west of the Drakensberg, and also of many of the table-mountains and spitz-kops in the country behind it. The dolerite has a further effect in hardening the shales in contact with it, and there are many instances of these hardened, vertically jointed shales forming precipices on the escarpment and other steep slopes. The thick dykes of dolerite often make conspicuous lines of rough kopjes rising from flat ground. Curious forms are produced by the great ring-shaped inclined dykes (or inclined sheets) which are characteristic of parts of the country. The dolerites have a great effect

on the surface features in the upper parts of the great valleys; in the flat country from Kimberley south-westwards to Calvinia the shales and hard dolerites are often cut to an almost level surface on which there is a deposit of tufaceous limestone; in these cases the dolerites are deeply weathered. These remarkably flat surfaces have been cut in several distinct formations, the Archaean on the north-west, the Dwyka series in the middle, and the Eccca further south. The Archaean floor of the Dwyka series in this region was worn flat in Dwyka times or earlier, and is now again being exposed by denudation, but the flat character of the whole area must be due to conditions which have existed for a long time past and are still in force. The chief factor seems to be the presence of the hard Archaean rocks athwart the courses of the rivers and in front of the region of soft shales and sandstones of the Eccca and Dwyka series. The rivers have very low grades in this area, and the action of the wind must be important in removing sand, possibly also in eroding outcrops; the wind has a retarding influence on the tendency of the streams to accentuate irregularities due to the presence of hard and soft rocks. Then again the formation of calcareous tufa in low-lying tracts tends to protect them and to raise their level. This area has large numbers of small shallow pans on it, especially on the outcrops of the Dwyka series and on the Archaean rocks bordering that belt; away from the Dwyka outcrops the pans rapidly decrease in number. The chief range of hills far from the watershed in this region is the Karreeberg, a flat-topped range of horizontal shales and sandstones, with dolerite sheets stretching through the Carnarvon and Fraserburg divisions. To the north, in the Prieska and Kenhardt divisions, there are prominent flat-topped ranges; the Doornbergen on the east with north-west trend, the shorter Ezel Rand with north-east trend, and the rough ranges, which have no name, on the borders of the Kenhardt and Prieska in the west, with north-westerly and northerly trends; these are all made of pre-Karoo beds and are the continuation

of the Asbestos, Langeberg, and other hills in Griqualand West and Gordonia, from which they are separated by the Orange River.

The region of the Upper Karroo ranges in height from 3,000 to 7,000 feet, and it is a country of small bush of markedly xerophytic character, and grass. The northern portion, the Orange Free State and the eastern side of Griqualand West, is mainly a grass country from which the thorn trees that were formerly scattered more or less thickly over it have been removed by man, either purposely or through grass-burning. Towards the south the grass diminishes in importance with the rainfall, but in the high country near the escarpment, where the rainfall increases again, the grass returns in abundance. With the exception of the Kimberley mining area, and a few other diamond mines, this region is a farming country, and in certain parts of it irrigation is being carried out on an increasing scale.

Bushman-
land.

No definite limit can be drawn between the Upper Karroo and Bushmanland, and, on the other hand, the latter region presents points of similarity to the Kalahari, from which it is separated by the valley of the Orange River. The chief characteristics of Bushmanland are its flat surface with a general covering of sand, the want of definite river channels, the abundance of shallow pans, scarcity of water, and the occasional steep hills of the 'Inselberg' type. On the south the surface is on the Dwyka series, and in the north on the Archaean gneiss and schists, but the details of its geology are not known. The water in wells and pans (except immediately after rain) is brackish. The vegetation is grass and small xerophytic bush. There are very few permanent habitations in the country, but farmers trek there with sheep and cattle when water is obtainable. The height of the country above sea-level rises from 2,000 feet or less near the Orange River to almost 3,400 in the southern part, but the hills reach 3,886 feet in Koeberg.

The
Namaqua
Highlands.

The Namaqua Highlands are on the north-western edge of the interior plateau. They are a rugged country of

gneiss with intercalated schists, partly covered in the west by nearly horizontal beds of the Nama system. The surface of Bushmanland rises westwards and becomes more and more deeply dissected by streams which enter the Atlantic either directly by the Green and Buffel's Rivers or by way of tributaries of the Olifant's River on the south or the Orange River on the north. For some two or three miles the head-streams in the Kamiesberg, which rises to 5,510 feet, and is the highest ground in Namaqualand, often have water in them during several months in the year, but the middle and lower portions only occasionally carry water in winter, and for many miles from the coast the Green and Buffel's Rivers are dry for years together. The division between the regions of summer and winter rains is very sharply marked in this quarter; Bushmanland depends on the summer thunderstorms for its water, and it remains dry while the winter rains fall on the country between the Richtersveld and Kamiesberg. A small area in the Kamiesberg is a comparatively well-watered country, but the rainfall decreases to 8 inches or less northwards. The extremely rugged and very dry country, partly enclosed by the bend of the Orange River, 60 miles from the sea, is called the Richtersveld. This tract of some 1,700 miles presents features of great geological interest; in the eastern part are great outliers of the Nama beds in a slightly disturbed state, and in the west what are probably the same beds are highly sheared and folded, and there is a large mass of granite intrusion into both these folded beds and the older gneiss on which they rest.

Between the southern part of the great escarpment and the Cape ranges there is a tract of comparatively low-lying country with a very dry climate; this is the Great Karroo. Its height ranges from little over 1,000 feet in the valleys of the Gamka and Dwyka Rivers, just behind the mountains, to over 4,000 feet in the Klein Roggeveld. The region has a thin soil and an abundance of rock fragments on its surface, except in the immediate neighbourhood of the larger rivers where there are narrow

The
Great
Karoo.

strips of thick alluvium. The vegetation consists of xerophytic bush sparsely scattered; trees only occur along the river beds. The form of the surface varies greatly with the disposition of the shales and sandstones which underlie it; in the south, in the belt bordering on the Cape ranges, where the strata are thrown into east and west folds which gradually decrease in amplitude northwards, there are hills trending east and west; to the north this hilly country gives place to wide plains on which there are low but sharp steps marking the outcrops of the harder or thicker sandstones; the Klein Roggeveld is a tableland with terraced declivities due to the outcrop of the harder layers in the horizontally bedded shales and sandstones. In the west, where the Cape ranges are represented by one great anticline, there are no hills east of the eastern limit of the Cedarberg anticline, and the featureless Tanqua (Ceres) Karroo alone lies between this anticline and the Roggeveld. In the southern part of Calvinia the Tanqua Karroo rises northwards and becomes merged in the country on the top of the escarpment.

The river system of the Great Karroo is of special interest, for the usually dry river beds, after a long course over ground with an altitude of from 1,000 to 3,000 feet, traverse the Cape ranges to the south and west by great 'poorts'. Another noteworthy feature is the extensive development of gravel terraces on the northern flank of the Cape ranges, and the outlying remnants to the north in the form of gravel-capped tablelands of small extent. Towards the east the Great Karroo grades into the terraced south-eastern region, the change being dependent on an increase in rainfall. The region is chiefly a sheep and goat-farming country and is, generally speaking, unsuited for agriculture.

South-
eastern
region.

The south-eastern region consists of the seaward slope from the great escarpment east of the neighbourhood of Graaff-Reinet. On the west it is fronted by the extreme eastern end of the Cape ranges, but further east only a narrow coastal belt intervenes between it and the ocean. It thus includes the eastern province of the Cape, and

the greater part of the Transkei, Pondoland, and Natal. The characteristic features of this region are the terraced form of the surface and the deeply cut river-channels. The climate varies considerably, the north-eastern portion having more rain and higher temperature than the south-western. The country rises from the coastal belt to the foot of the great escarpment, some 5,000 feet above, and the rivers have steeply graded beds, often broken by falls or rapids over the outcrops of the harder rocks. The whole region is made of nearly flat-lying Karroo beds, with more or less abundant intrusions of dolerite, often in the form of slightly inclined sheets ; thus, owing to the resistance offered by the thick sandstones and dolerite sheets to the agents of denudation, there is a tendency to the production of flat terraces bounded by escarpments, and of deeply sunk valleys along the larger streams.

The vegetation is mainly grass, but patches of forest occur in protected areas, chiefly on the face of steep escarpments and in the smaller head-valleys.

The Transvaal low country lies to the north of the south-eastern region and includes the district between the escarpment and the Lebombo range, the Limpopo Highlands, and the Limpopo River. It is an undulating country, from 500 to 4,000 feet above sea-level. The chief range in it, the Zoutpansberg, is an outlying portion of the Limpopo Highlands ; the minor ranges and hills of the 'Inselberg' type are due to belts of schists and resistant granitic rocks. The Lebombo range runs north and south, and is made of Karroo beds dipping east ; it is the limb of a gentle monoclinal fold which brings those beds down from the Transvaal Highveld to below sea-level in Portuguese territory and Zululand.

The Cape Ranges or Folded Belt

Between the Van Rhyn's Dorp district in the west and the east shore of False Bay there lies a mountainous tract roughly parallel to the coast ; between Ceres and False Bay other ranges abut against these and can be followed eastwards for some 450 miles. They are cut off obliquely

by the coast between Agulhas and the Peddie district. The mountains are rough and bare-looking, though even where the veld is frequently burnt there is much vegetation between the rocks, and where protected from fire the less precipitous parts become covered with thick bush. The valleys in this region are the richest and most populous agricultural districts in the Cape province, owing to the nature of the soil and the facilities for irrigation. The valleys lie between 200 and 2,000 feet above sea-level, and the mountains rise to 7,382 feet in Matroosberg near the Hex River, and to 7,628 feet in the Seven Weeks' Poort Mountain; many peaks exceed 6,000 feet.

By far the greater part of the region is made of the Cape system, but it is edged on the north by the lower portion of the Karroo system, of which there are also important outliers in the Worcester district; the Uitenhage (Neocomian) beds occupy parts of the valleys. The Karroo strata are involved in the folds which gave rise to the mountains, but the Uitenhage beds are not, though they are thrown down along faults parallel to the axes of the folds in the older rocks.

In the north-west the mountains start in Van Rhyn's Dorp, where the thick sandstones of the Table Mountain series, which lie nearly horizontally, first show flexures; these flexures, of which the axes run a few degrees east of south, become more and more pronounced towards the south, and near Clanwilliam the amplitude of the Cedarberg fold is over 6,000 feet.

Near Ceres, where the east-west folds meet the Cedarberg group, the arrangement becomes more complicated, and diagonal ranges are developed. East of Ceres overfolds are found, especially in the Zwartberg and Langeberg ranges. There are several axes of folding roughly parallel to each other, but any one anticlinal axis is found to die out, and perhaps to be replaced by another on nearly the same line further on. In most cases a distinct arc, concave to the coast, is formed by each axis. The amplitude of the folds is probably greatest in the Zwart-



PLATE I. ZWARTBERG PASS, PRINCE ALBERT
(High Commissioner for South Africa)



PLATE II. CAMPS BAY
(High Commissioner for South Africa)

berg range, and it diminishes eastwards; there is also a slight inclination of the axes towards the east, so that beyond Port Elizabeth the Table Mountain series no longer appears at the surface in the folded belt. There is no counterpart in the east to the meeting of the two great sets of folds in the west, for the coast cuts diagonally across the folds and reaches the terraced region made of flat Karroo beds in East London and the Transkei. Where the Cape formation appears again in Pondoland and Natal it lies nearly flat, as in Van Rhyn's Dorp, though there is the curious horst of St. John's, a relatively raised block of Table Mountain sandstone, surrounded by faults, which is like nothing in the north-west. What lies concealed under the ocean off that coast is of course not known.

The lower level of the Cape formation there, and the consequent lack of symmetry in the structure of the country bordering the south coast of the continent may be connected in origin with the asymmetry in the structure of the escarpment due to the great development of the upper part of the Karroo formation in the south-east.

The rivers of the folded belt run east or west in the synclines (north in the Cedarberg region), or over the Uitenhage beds, till they meet one of the large transverse valleys which cut through the ranges on their way from the Karroo. Hence the main drainage lines of the region lie athwart the axes of folding. Where the rivers pass through the larger anticlines, as at the poorts of the Gamka, Buffel's, Gouritz, and Doorn Rivers, the valley sides rise precipitously several hundred feet from the river beds.

The Coast Belt

On the coast side of the folded belt there is usually a more or less dissected terrace sloping gently to the sea, with an average height of 700–1,000 feet (Uplands terrace or plateau). This plateau resembles those found between the ranges, and it is bounded by cliffs (Mossel Bay, George) or by a narrow strip of low country along the coast. Similarly the south-eastern region terminates

in low cliffs or has a strip of sand-covered lowland in front of it. On the west coast and in the north of Natal and Zululand the low country on the coast is much wider and rises gradually towards the interior. In the north-west the coast belt has very little rain (two inches), but heavy fogs support a thick growth of bush behind the sand-dunes. North of Natal the coast belt is a series of swamps in the rains.

The South African coast is remarkable for its regular form and poverty in headlands and bays. The west coast is almost straight between the Orange River mouth and St. Helena Bay, and the east coast is also remarkably even between Algoa Bay and St. Lucia Bay. Between St. Helena and Algoa Bays the coastline is more indented, first by Saldanha Bay, which is the only good natural harbour in South Africa, then by the bays on either side of the Peninsula, and further east by the slightly marked bays, open to the south-east, found where the shore cuts obliquely across successive belts of the resistant rocks of the Table Mountain series. The straightness of the east and west coasts has given rise to some discussion; on the one hand it is thought that the existence of faults with downthrow on the ocean side must be assumed in order to account for the facts; and on the other, seeing that faults strictly parallel to the coast and with downthrow towards the ocean are unknown on the land, it has been suggested that flexuring about a nearly horizontal axis has determined the position of the coast.

An advantage of the latter hypothesis is that it accounts for the existence of depressed and raised areas in close proximity, according to the position of the axis just above or below sea-level at each place. The evidence of depression is found in the over-deepened river channels now filled with sand or mud and the characters of the lagoons at the mouths of several rivers; the evidence for upheaval is got from raised beaches and terraces.

The continental platform bounded by the 100 fathom contour round South Africa is very narrow on the east coast, widens out to over 100 miles in the south, where

it is called the Agulhas Bank, and narrows again on the west coast. The depth increases rapidly to the east and west of that contour, less quickly to the south, and it may represent approximately the position of the coast at some former time.

A curious feature in the south-west is found in the Cape Flats, a low sand-covered tract connecting the island-like peninsula with the mainland. It looks as if it must have been under the sea, and has been so described by several writers, but no trace of marine deposits has been found under it. Beds of lignite and peat are intercalated with the sand, and they are found below high-water level near the sea as well as far from it. The Flats are probably, therefore, due to stream erosion, and their average level is being raised by sand blown in from Table and False Bays.

GEOLOGICAL HISTORY OF SOUTH AFRICA

It is an unfortunate fact that up to the present time no determinable fossils have been found in South African rocks older than the Bokkeveld (Lower Devonian), so that all correlation of the older beds within the country depends entirely upon lithological characters and structure. Another consequence is that no horizon can be determined as of Cambrian age, and, therefore, local terms alone can be used in describing the stratigraphy of the formations older than the Devonian. An exception is made in the case of the very ancient rocks referred to in this chapter as the Archaean, because the use of the several local terms applied to them in different parts of the country would only be confusing.

Archaean
rocks.

These Archaean rocks consist of sedimentary and volcanic beds which have been more or less altered by the intrusion of granite or gneiss and also by shearing. The dip is usually high, and the true order of succession is in many cases uncertain. The volcanic rocks have often undergone great alteration, being represented by schists and granulites, the original nature of which is recognized by tracing their connexion with less altered beds or by

the presence of amygdaloids. An interesting feature, the meaning of which is not fully understood, is the repeated occurrence of banded magnetic cherts, which are found in the Archaean as well as in the Witwatersrand and Transvaal systems. The limestones are accompanied by lime-silicate rocks. In the North-eastern Transvaal, Bechuanaland, Prieska, and Kenhardt these Archaean beds form the worn-down remnants of considerable ranges with various trends, about east-north-east in the Transvaal, and between north and north-west in the Cape Province. These beds were invaded by the granitic rocks referred to here as the Archaean gneiss, but whether there was more than one great intrusion is not yet known. In the North-eastern Transvaal the granite of the Palabora Hills has been proved to be a later intrusion than the Archaean gneiss surrounding it, but it is very probably older than the Transvaal system.

Witwaters-
rand
system.

These Archaean rocks had long been exposed to denudation before the sediments of the Witwatersrand system were deposited. The latter consist of quartzites with pebble beds, ferruginous and siliceous rocks and hard shales; volcanic rocks are represented by some intercalated sheets of amygdaloidal diabase. Some of the quartzitic conglomerates, locally called blanket-reefs, contain the gold on which the chief mineral industry of the Union is based. The Witwatersrand formation, the lower group of which is estimated to be over 12,000 feet thick, bears little evidence of deposition under marine conditions, and it belongs to a class of sediments, widely developed in Africa during several different geological periods, called 'continental deposits', a term which includes rocks formed in river basins, lakes, or deserts, in fact under any circumstances except under sea-water. These beds have only been definitely recognized in the Southern Transvaal and the extreme northern part of the Orange Free State. They were thrown into folds before, or during, as well as after, the great volcanic outbursts which characterized the period represented by the succeeding Ventersdorp system.

The Ventersdorp beds are found in the Southern Transvaal, the northern part of the Orange Free State, Bechuanaland, Griqualand West, Hopetown, and Prieska, and they are perhaps represented by the Koras series, chiefly of volcanic rocks, of Kenhardt and Gordonia. They are divided into three groups by unconformities, which indicate repeated earth-movements over a large part of South Africa during a prolonged period of volcanic activity and the formation of various sedimentary rocks. So far as is known the earliest (Zoetlief) rocks of this formation are the quartzites and conglomerates in the Vryburg and Kimberley districts, and round Beer Vley south of the Orange River. These sediments are followed by devitrified rhyolitic lavas; the greatest observed thickness of sediments and acid lavas together is 1,300 feet, in the Kimberley mine. In Prieska and Hopetown, the Kuip series, a group of felspathic sandstones, flagstones, limestones, cherts, and andesitic lavas overlie the Zoetlief beds, and are in their turn covered unconformably by sediments (conglomerates, quartzites, flagstones, and calcareous beds) and lavas of intermediate and acid composition; these rocks are known as the Pniel series, and they are the most widely distributed group of the Ventersdorp system; they cover large areas in the valley of the Vaal River in the South-eastern Transvaal and in Griqualand West. That they underwent a considerable amount of erosion in several areas before the Black Reef series began to be laid down is proved by the unconformity between the two formations, yet lavas of the Pniel type occur in the Black Reef series, and just above it, in the Vryburg district. The Black Reef series forms a very well-defined horizon over a large region which stretches from the North-western Transvaal to the Prieska district, and it is adopted as the lower limit of the important group of rocks called the Transvaal system, but in the Vryburg district the unconformity at the base is of the same order as those within the Ventersdorp system, and is of much less significance, as a structural feature, than the unconformities at the bases of the

underlying Witwatersrand formation and the overlying Waterberg formation.

Transvaal
system

The Transvaal system consists of the mainly arenaceous Black Reef series, the great dolomitic limestone and chert group called the Campbell Rand series, and the arenaceous and shaly Pretoria series, with which lavas are interbedded. The Black Reef series is thickest in the North-western Transvaal, but it maintains its characteristic features throughout its range as far as the Prieska district, and the Campbell Rand beds are also remarkably constant in character over an equally large area; the sedimentary rocks of the Pretoria series, on the other hand, undergo considerable changes in lithological nature towards the west. In the Eastern and Southern Transvaal they consist of hard shales and several persistent bands of quartzite, with a volcanic group underlain by conglomerate in the middle of the series; in Griqualand West and Prieska, quartzites are unusual, shales of a normal kind only appear over small areas, and the characteristic rocks are siliceous beds, cherts, and jaspers, more or less rich in magnetite, haematite, or limonite. Another remarkable feature in Griqualand West is the widespread occurrence of a soda-amphibole, crocidolite, in these ferruginous rocks, either distributed at random through them or arranged in layers parallel to the bedding planes. Thin limestones are found near the top of the lowest of the three subdivisions into which the series has been divided in Griqualand West; at the top of this subdivision and just below the volcanic (or Ongeluk) beds there is a very well-marked glacial conglomerate, the oldest of the three groups of glacial beds hitherto found in South Africa; the area enclosed by the outcrops of this conglomerate is some 3,000 square miles. The Ongeluk volcanic beds consist of andesitic lavas, tuffs, and breccias, occasionally with beds of jasper. The lavas are identical in character with those on the same, or nearly the same, horizon in the Transvaal. The Pretoria series is much thicker in the Transvaal than in the Cape Province, but this difference is due, in part at least, to the upper beds having been

removed by denudation to a greater extent in the west than in the east before the rocks of the Waterberg system were formed.

It appears very probable that the Nama system, which plays an important part in the structure of the western part of South Africa, from Damaraland down to the Peninsula, is the western correlation of the Transvaal system. The grounds for this identification are lithological resemblance and the structure of the country, but, as much of the evidence comes from German territory, full details cannot be given here. In the Cape Province the Nama system consists of three members, a group of felspathic sandstones, quartzites, and hard shales, the Nieuwerust series, succeeded conformably by the Malmesbury series, shales, limestones, and quartzites, which in many areas are unconformably overlain by a thick group of shales, conglomerates, and arenaceous beds called the Ibiquas series. The Nama formation was invaded by great masses of granite in the south-west and west-coast regions of the Cape Province before the deposition of the Table Mountain series, and in the same districts it was thrown into great folds, so that the dips are very high over wide areas, but in the north of Van Rhyn's Dorp and a belt of country running northwards through the middle of Namaqualand, these beds are comparatively slightly disturbed and lie at low angles; in that region they are not penetrated by granite.

We now come to a point upon which opinions differ widely. In the Transvaal, Bechuanaland, Griqualand West, and Prieska there is an important formation called the Waterberg and Matsap group in the east and west respectively. These two groups have not been traced continuously from one area to the other, yet there are close resemblances between them and they will here be considered as parts of one system. There are very strong reasons, based on the structure of the Cape Province, for regarding the Matsap beds as older than the Table Mountain series. On the other hand, the Waterberg system is considered by some geologists to be the northern

representative of the Table Mountain series. There is no evidence obtainable from fossils, and a discussion of the question would involve too much detail for this place. The writer can only follow his opinion that the Matsap and Waterberg are one system, which is older than the Table Mountain series.

The Waterberg system consists, in the Transvaal, of a lower and an upper group with an unconformity between them. The lower group, best developed in the north-western part of the country, is chiefly a series of felsitic lavas with interbedded shales, while the upper division is made of conglomerates in which felsite boulders are often abundant, sandstones, grits, and shales, of red, purplish, or brown colours. These rocks form a large area of rough country in the Waterberg district, the Zoutpansbergen to the north-east, and a smaller tract east of Pretoria.

The Matsap beds form the long series of ranges which commence in the Ezel Rand of Prieska, and are continued northwards in the Langeberg and the Korannabergen of Bechuanaland; they appear at intervals from beneath the sands of the Kalahari in the Molopo valley and in the Protectorate. They consist of purplish quartzitic grits, quartzites, conglomerates, hard shales, and a thick volcanic group (andesitic lavas and tuffs); the volcanic beds lie in the middle of the Matsap series. From the Prieska district northwards the base of the Matsap beds lies upon younger and younger members of the older series, from the Ventersdorp volcanics to the highest-known beds of the Griquatown series. The earth movements which produced overfolds and small thrusts in the Ventersdorp, Transvaal, and Matsap beds in western Prieska and Griqualand were of post-Matsap age and gave rise to mountain ranges which were exposed to denudation in Dwyka times; outliers of the Dwyka occupy the bottoms of old valleys in those ranges, and are themselves free from the effects of earth movements. A similar relationship between the Dwyka and the Waterberg system obtains in the Transvaal, but in that

province there are no considerable mountain ranges formed of folded Waterberg rocks.

After the deposition of the Waterberg system great intrusions of igneous rocks took place in the Transvaal, forming what is perhaps the most interesting feature in the geology of that province. So far as it is exposed, the main body of igneous rock extends over an area 280 miles long from east to west and 160 wide from north to south. In the Waterberg district it is still partly covered by the Waterberg formation, and in the Springbok Flats, as well as in many other smaller areas, Karroo beds lie unconformably on it. The intrusions made their way along the base of the Waterberg formation; thus they lie between those beds and whatever the latter happened to rest upon, generally the Pretoria beds or some lower stage of the Transvaal system. The form of the great mass of igneous rock is that of a laccolite, but, owing perhaps to depression consequent on the withdrawal of so large a body of magma from below the area, the floor sank, and the dip of the beds forming its exposed edges is towards the interior of the laccolite. The rocks of the laccolite range in composition from ultra-basic to ultra-acid, and they are known collectively as the Bushveld Igneous Complex. The greatest bulk at the surface consists of a granite rather rich in soda, called the red or newer granite to distinguish it from the Archaean or older granite of the Transvaal, but towards the base of the laccolite, and therefore exposed round a large part of the periphery of the main body of the complex, the rocks are norite and diabase. That these basic portions in certain localities consolidated first is proved by intrusions of the red granite in them, but in some places there is a gradual passage from one rock to the other. The ultra-basic (peridotites, pyroxenites, and magnetite rocks) and ultra-acid rocks (quartz rocks and greisen) occur in much smaller volume traversing the other varieties, lying between them or cutting the surrounding or overlying beds of the Transvaal and Waterberg systems. The abundant sheets and dykes of diabase in the rocks surrounding the

Bushveld Complex are regarded as offshoots from it. In the Pilandsberg, near Pretoria, and at a few other places, there are some remarkable soda-rich rocks of the nepheline-syenite and related types. In the former locality a volcanic group of post-Waterberg age is accompanied by intrusions of the nepheline-syenite family.

The intrusions of the norite and granite had very marked effects on the surrounding rocks, especially on the Pretoria beds, the metamorphism of which has been closely studied. The chief result is the production of rocks rich in cordierite, biotite, andalusite, and other metamorphic minerals; but in several localities the altered rocks contain pyroxene and amphiboles probably formed from material transferred from the intrusive magma to the sedimentary beds.

So far as is known there are no intrusions in the Cape Province analogous to the Bushveld Complex, unless the comparatively unimportant diabase sheets and dykes of Griqualand West and the Prieska syenite can be regarded as such.

Cape
formation,
&c.

In the south and west of the Union, according to the views adopted here, there is no formation that can be attributed to the Waterberg system, but the beds of the Nama (Transvaal) system were plicated, invaded by great masses of granite, and subjected to prolonged denudation before the deposition of the Cape formation. This important system is divided into three groups on lithological grounds; the Table Mountain series at the base consists chiefly of quartzitic grits and sandstones with subordinate pebbly beds; arenaceous shales are occasionally found, and near the top there is a group of argillaceous beds which include, in the Cedarberg region, a glacial conglomerate. The quartzitic sandstones of this series give characteristic features to the long southern ranges of the Cape. The series is followed conformably by the Bokkeveld beds, shales, and argillaceous and calcareous sandstones, the lower part of which contain the earliest fauna yet discovered in South Africa, the remains of marine animals of Lower Devonian affinities. The

Bokkeveld beds are succeeded conformably by the Witteberg beds, pale quartzites and dark shales, which have only yielded a few casts of plants and fragments of an eurypterid. The Table Mountain series maintains its characteristic features throughout its range from Van Rhyn's Dorp in the west through the southern ranges of the Cape to Port Elizabeth, where it disappears under the sea, but it reappears with similar characters in Pondoland and Natal. It is a typical 'continental' deposit, and there is no evidence that any part of it was laid down under the sea, and the same may be said of the upper part of the Bokkeveld and the whole of the Witteberg series. The Bokkeveld and Witteberg beds become more argillaceous as they are followed southwards from the country on the borders of the Great Karroo towards the coast.

How far north these beds once extended is not known; both in the west and east of South Africa they are unconformably overlapped by the Dwyka series, which in the country south of lat. 33° appears to follow them conformably. This supposed conformity is based on the fact that a similar succession from the Table Mountain series up to the Karroo beds has been found not only along the 450 miles of outcrop between the Cold Bokkeveld in the west and Grahamstown district in the east, but also in the Worcester district on the south side of the Cape ranges and in the folded outliers within the ranges; nowhere in that region has the Dwyka been found resting on lower beds than the Witteberg.

The total thickness of the Cape formation is about 10,000 feet, and there must have been more or less continuous depression of the southern end of the continent during its deposition; but at some time during that period subsidence ceased in the country north of lat. 33° , and a gradual uplift exposed the newly deposited beds to erosion. South of that latitude the depression continued far into Karroo times.

The early part of the Karroo period was marked by the prevalence of glacial conditions over the South African ^{Glacial} beds.

as in other portions of the southern continent called Gondwanaland, which stretched during Carboniferous, Permian, and Triassic times from South America across Africa to the Indian peninsula and Australia. Within the Union traces of glaciation have been found as far north as S. lat. $22\frac{1}{2}^{\circ}$, but the recent discovery of glacial beds, which are correlated with the Dwyka, in S. lat. 10° in the Congo State, extends the range enormously. Up to the present time no satisfactory explanation of the former existence of glacial conditions over so wide an area in tropical and temperate regions has been found. The movements of the ice, as shown by the direction of the striae on the floor beneath the conglomerate and by the distribution of boulders, was southerly. The thickness of the hard boulder-clay or tillite varies from a foot to 1,000 feet. The great thicknesses are found especially in the south of the Karroo, where there is a conformable passage from the underlying beds. It is worth noting that such great thicknesses of boulder-clay spread over wide areas are unknown amongst the products of the Pleistocene Ice Age in the northern hemisphere.

The glacial beds are overlain by shales, cherts, and thin limestones south of the Vaal River. To the north of the Vaal, and probably also for some miles to the south, the sequence differs from that found within the Cape Province; there is an unconformity in the north above the glacial beds, and the smooth-pebble conglomerates, sandstones, shales, and coal beds found above them are probably representatives of beds which lie far above the conglomerates in the south. Different opinions are held on this matter, and the evidence from fossils is at present insufficient to decide the question. The only fossils yet found in the Dwyka tillite and the Upper Dwyka shales within the Union are *Gangamopteris* and *Mesosaurus*, but near Keetmanshoop, in German territory, the marine forms *Conularia* and *Eurydesma* occur in beds that lie just above the tillite.

Karoo
system.

The Karroo system is much more fully developed in the south-east of the Cape Province and the neighbouring

part of Natal than in the Transvaal. In the former regions it consists of some 16,000 feet of shales, mudstone, and sandstones, with a capping of 4,000 feet of volcanic beds, but in the Transvaal it is perhaps not much more than a tenth of that thickness. At present the explanation of the difference is imperfectly understood, but it seems that the Dwyka, Eccca, and Beaufort series, and the Molteno beds of the Stormberg series thin northwards, while the higher divisions of the Stormberg are also less fully developed in the Transvaal.

The Eccca and Beaufort series are very much alike lithologically, though in each the development of thick sandstones characterizes certain horizons traceable through considerable distances. The Eccca beds are more arenaceous in the south than in the north and north-west of the Karroo. The Beaufort beds are the source of many reptilian fossils, some with mammalian characters, and forms with generalized structure. The lowest (Molteno) group of the Stormberg series consists of pebbly and coarse sandstones and shales, and is the coal-bearing formation of the Cape Province. The fossils in these beds are almost entirely plants; the succeeding Red beds and Cave sandstone are mainly arenaceous strata; they have yielded dinosaurians, a few fish, a crocodile, and a mammal, *Tritylodon*.

The conditions under which the Karroo sedimentary rocks were deposited are but little understood. The fact that some 15,000 feet of non-marine beds with an extremely small proportion of conglomerates or gravels were formed over part of the district can only be explained by the assumption of long-continued subsidence in an area to which a river system brought down much mud and sand. Possibly some of the thick sandstones of the upper portion may represent sand-dunes, but for the greater part of the formation deposition on land cannot be accepted. It may be that the area was somewhat of the nature of the great Indo-Gangetic plains, but further from the source of the sediments, so that pebble beds were limited in extent and were only formed during

Deposition of Karroo sedimentary rocks.

short periods (part of the time represented by the Molteno beds). It is probable that the surface of deposition was kept at a level near that of the ocean. There is no evidence, in the form of salt beds, gypsum, or tufaceous limestones, that the area was ever one of internal drainage from which water escaped only by evaporation. The existence of a lake for so prolonged a period (Carboniferous to Jurassic times) is almost impossible to believe.

At some period during the deposition of the Karroo beds, probably just before the Molteno beds were laid down, earth-movements of the mountain-building kind made themselves felt in the south and west; the chief result was the production of anticlines in which all the beds from the Beaufort series downwards were involved. There are two large groups of these anticlines, the symmetrical folds of the Cedarbergen on the west with axes trending north-north-west, and the Zwartberg folds on the south with east and west trend. The axes of the fold are not quite straight, for they are wide arcs concave towards the ocean. The overfolding is towards the interior of the country, and so are the thrusts in cases where certain strata are pushed over younger beds. Where these two groups of folds meet there are diagonally placed folds and faults.

Jurassic
igneous
period.

The great volcanic outbursts which brought the Karroo period to a close affected a very large area in Basutoland, the central and eastern Transvaal and Rhodesia; whether these isolated districts are parts of a once continuous volcanic region is not known, but the intrusive phase of the igneous activity, of which the volcanic phase is represented in those five areas, affected a much greater area, almost the whole of British South Africa as well as part of German South-West Africa. The evidence is in the form of dykes and sheets of dolerite. The only important region where these intrusions are not found is the folded belt of the west and south, though where the folding became insignificant, as in the Cape Peninsula, Pondoland, and Van Rhyns Dorp, the dolerite intrusions are again met with.

Since this (Jurassic) period of igneous activity the whole interior region appears to have remained well above sea-level and to have suffered continuous denudation. In Lower Cretaceous times the southern folded belt became partly buried under torrential and river deposits, represented by the conglomerates, sands, and clays of the Uitenhage series ; towards the east the valleys in which these deposits were laid down were open to the sea, for beds with marine fossils are there found intercalated with, and lying upon, the non-marine deposits. How far west of Knysna the sea encroached upon the folded belt is not known. After these Lower Cretaceous rocks were formed, they were let down to the south along faults parallel to, and on the south side of, the east and west anticlines. No similar events are known to have happened in the western (Cedarberg) region.

Lower
Cretaceous and
later
periods.

The Lower Cretaceous beds (Neocomian) are covered unconformably over a small area in Alexandria by what are possibly Upper Cretaceous (Danian) shallow-water marine limestones, and these latter beds overlap the Uitenhage and are found lying on Karroo beds to the north-east near East London. During the interval between the Neocomian and Danian, the Cretaceous sea encroached upon what is now the east coast ; in Pondoland and Southern Natal the strata then laid down are represented by very narrow strips above high-water mark, and consist of Senonian beds resting upon Karroo or older rocks ; but in Zululand, where the Cretaceous area becomes very much wider, Cenomanian beds come in below. Thus after a short advance and retreat of the ocean in Lower Cretaceous times, it advanced south-westward on the African coast at a later date, but it never seems to have covered a considerable part of the country below the great escarpment.

Cainozoic marine deposits are represented by certain shelly limestones in the Alexandria, Uitenhage, and Bredasdorp districts, and also in Zululand, but little is known of them as yet.

At some period since Uitenhage times a curious form

of igneous activity broke out sporadically over practically the whole of South Africa, and resulted in the formation of 'pipes' and fissures filled with ultra-basic igneous rocks and various breccias. The best known of these are the pipes in which diamonds are found scattered through a peridotite-breccia (Kimberlite); but there are connecting links between these breccias and the similarly-shaped bodies of melilite-basalt and nepheline-basalt. The youngest rocks known to be pierced by the peridotite breccias are the Stormberg beds and the dolerite intrusions, but melilite-basalt pierces Uitenhage beds in the Riversdale district.

Whether any of these fissures or pipes, which simulate volcanic necks, actually reached the surface and gave rise to tuff-cones or lava-flows is not known. They are distributed irregularly; the chief groups are those of the Kimberley and the Orange Free State, Pretoria district, Sutherland district, and western Bushmanland, but considerable numbers occur elsewhere from German South-West and Rhodesia down to East Griqualand. Their arrangement has no obvious relation to any structural feature in the continent.

Origin of
present
main
water-
shed.

The existing main watershed appears to have been derived from the shape of the land at the close of the Karroo period. It no doubt lay nearer the present position of the coast line and has since retreated north-westwards, away from the steeper slope of the country. There are remains of high-level terraces on both sides of the watershed. On the Atlantic side the most important are those of the Kaap-Stormberg plain, rising from 4,000 to 6,000 feet above sea-level, and on the Indian Ocean slope the chief remnants are those of the Uplands (700-1,000 feet) and the De Vlucht terraces; though there are no marine beds found on them except where the Uplands plain merges into the raised-beach deposits of shelly limestone quite near the coast. It is probable that these old plains and terraces were formed when the sub-continent stood at low levels during long periods, possibly also the climate was drier then than now. The great plains of the Kalahari have probably been subject to a drier climate than the

present during part of the long period since the Karroo rocks were laid down there, but at some time the rivers from the north and west were able to cut deep channels through the region; and at the present day the sand-dunes formed under a more rigorous climate are fixed by vegetation.

The history of the southern slope can be made out in part from the relation of the river system to the geological structure of the region. The rivers join to pass through the southern and western mountains by deep poorts, and they receive important tributaries from the longitudinal valleys within the folded belt. They pass over the Uitenhage beds without deflections, and were evidently initiated at a time when the Uitenhage beds filled the great longitudinal valleys and the surface had a general southerly slope. There is no evidence that the present transverse valleys have resulted from the capture of rivers flowing eastwards in longitudinal valleys in the direction of slope of the main axes of the Zwartberg folds.

[For Geology, the *Reports* published annually by the Geological Commission of the Cape of Good Hope (Cape Town) should be consulted. Those graphs for 1901 and 1902 may be indicated particularly as dealing with extensive areas—the region west of the High Veld; while that for 1908 is concerned with parts of Prieska, Hay, Britstown, Carnarvon, and Victoria West. Reports are also published by the government geologists of the Transvaal and Natal. See also articles in *Science in South Africa*, Cape Town, 1905, for the geology of all divisions of South Africa; *The Geology of the Transvaal and the Orange River Colony* (British Association Handbook), Cape Town, 1905; F. H. Hatch and G. Corstorphine, *Geology of South Africa*, London, 1909; C. H. Stott, *Geology of South Africa*, Cape Town, 1909; E. H. L. Schwarz, *South African Geology*, London, 1912; and on particular areas, A. W. Rogers, *Introduction to the Geology of Cape Colony*, London, 1904; J. P. Johnson, *Geological and Archaeological Notes on Oranania*, London, 1910; A. L. Hall, *Geology of the Murchison Range and District*, Pretoria, 1912. Among works of a more general character, which include topographical description: Somerset Playne, *Cape Province*, London, 1912; A. H. Tatlow, *Natal Province* (Official Guide), London, 1912; T. G. Trevor, 'Physical Features of the Transvaal', in *Geographical Journal*, July, 1906.

Surveys by the Geographical Section of the General Staff cover the Orange Mapping. Free State and Basutoland, about 100,000 square miles in Cape Colony, and a small area in Transvaal, but publication is not complete. There are also various series of farm surveys. A very notable geodetic survey has been made: see Sir D. Gull, *Report on the Geodetic Survey of South Africa*, Cape Town, 1896–1905.]

CHAPTER II

(CLIMATE AND WEATHER)

By C. STEWART

Physical
features.

THE term South Africa is taken here as referring to that portion of the African continent extending from the valley of the Zambezi, in about latitude 15° S., southwards to Cape Agulhas in approximately 35° S., and lying between 12° and 36° E. longitude. This area includes the British possessions of the Cape of Good Hope, Orange Free State, Transvaal, and Natal, constituting the Union of South Africa, together with Basutoland, Bechuanaland, and Rhodesia.

Topographically considered, South Africa consists essentially of four elevated plains or plateaus, separated from each other by steep escarpments rising to a considerable elevation above the tablelands and appearing, when viewed from the coast, as a series of high mountain ranges running roughly parallel with the coast. This division into plateaus is most distinctly seen in traversing the country from south to north, but is not so well defined in the west where the slopes are more gradual, nor in the east where the plateaus sink in terraces. These plateaus may be described as follows :

1. The coast plateau or coast flats, having an average elevation of 500–600 feet, and varying considerably in width, from about 30 miles in German South-West Africa to 3 or 4 miles or even less in the south-east of the Cape Colony.

2. The Southern or Little Karroo, a narrow tableland about 15 to 20 miles in width and of an average elevation of 1,500 feet.

3. The Central or Great Karroo, having an average altitude of 2,000–3,000 feet.

4. The Northern or Upper Karroo, or High Veld, is the

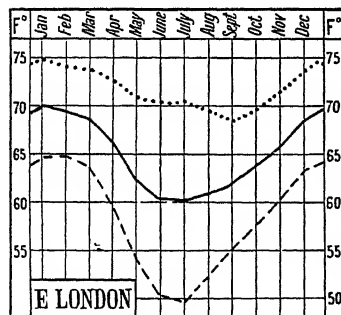
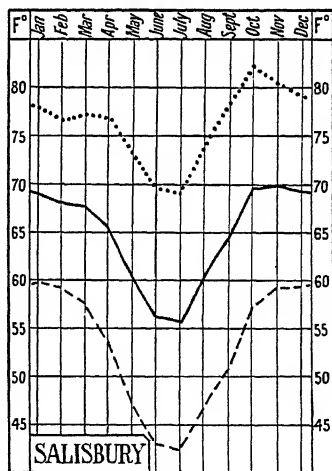
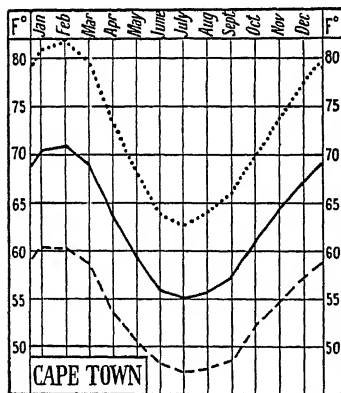
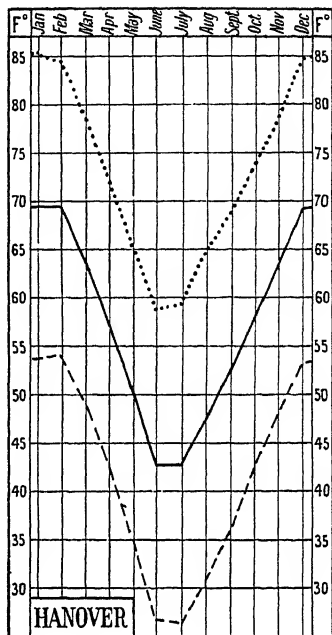
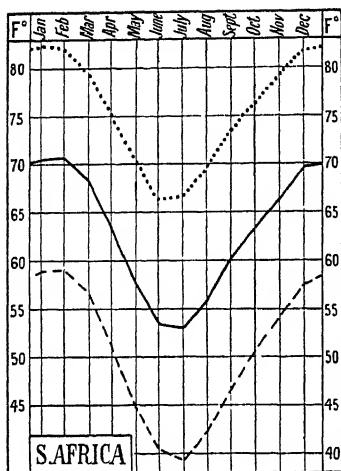


FIG. 12. Monthly Temperatures (maxima, mean, and minima).

innermost plateau, and has an average elevation of about 4,000 feet, rising in the eastern portions to 6,000 feet. From the Drakensberg the land slopes northwards and westwards towards the Limpopo and the Orange Rivers, decreasing gradually to an elevation of less than 3,000 feet, but rising again to over 4,000 feet in the Mashona-Matabele Plateau of Rhodesia and the Damanama Plateau of German South-West Africa.

By far the greater portion of South Africa has an elevation of over 3,000 feet, the highest parts of the Drakensberg having an altitude of 11,000 to 12,000 feet, whilst the area below 1,500 feet forms merely a narrow fringe around the coast.

Tempera-
ture.

The effect of this plateau-configuration in controlling and modifying the climate of South Africa is particularly well brought out by the remarkable uniformity in the annual mean temperatures of stations distributed over the various parts of the country, as may be seen from the following table :

TABLE I
ANNUAL MEAN TEMPERATURES

<i>Stations.</i>	<i>Lat.</i>	<i>Long.</i>	<i>Alti- tude.</i>	<i>Annual mean temp.</i>	<i>Stations.</i>	<i>Lat.</i>	<i>Long.</i>	<i>Alti- tude.</i>	<i>Annu mean temp.</i>
				Fahr.					Fahr.
Cape Town	33° 55'	18° 25'	115	62·6°	Umtata	31° 35'	28° 46'	2400	63·0
O'okiep	29° 36'	17° 52'	3036	63·0°	Pretoria	25° 45'	28° 11'	4392	63·5
Mossel Bay	34° 11'	22° 9'	105	63·3°	Pietersburg	23° 56'	29° 24'	4130	63·4
Graaff-Reinet	32° 16'	24° 32'	2460	63·6°	Salisbury	17° 48'	31° 5'	4800	64·6

From the above it will be seen that Salisbury in Rhodesia, although within the Tropics and 16° nearer the equator, has a mean annual temperature only 2° higher than Cape Town, whilst Mossel Bay has practically the same annual temperature as Pretoria and Pietersburg, which lie approximately 8½° and 10¼° farther north. Fully two-thirds of the stations on the observations of which this chapter is based have a mean annual temperature between 59° and 64° F., the main exceptions being found along the east coast or in valleys, and a few in Rhodesia. The coldest station is Disa Head (Table

Mountain) in the Cape Peninsula, where, at an altitude of 2,500 feet, the annual mean temperature is 54.7° ; whilst the warmest station is Komati Poort (lat. $25^{\circ} 26' S.$, long. $31^{\circ} 56' E.$) in the Transvaal, on the borders of Portuguese East Africa, where an annual mean temperature of 73.1° is met with at an elevation of only 460 feet and at a distance of 55 miles from the sea. There is therefore a difference of 18.4° in the annual mean temperatures of the coldest and warmest places known in British South Africa. As a result of this uniformity of mean annual temperature, it is evident that the main climatic differences must be sought in the mean daily range or the mean difference between the day and night temperatures, and the mean annual range or the difference between the coldest and warmest months.

Speaking generally, the mean daily range increases from the coast inwards, averaging slightly over $12^{\circ} F.$ at the south coast stations and increasing to over $30^{\circ} F.$ in Basutoland and parts of the High Veld, where, however, it is mostly between 26° and 28° . The extremes vary between $10.4^{\circ} F.$ at Cape Agulhas and $35.2^{\circ} F.$ at Umsinga in Natal. An indication of the differences in climate at the eight stations given in Table I will be gained from a consideration of the annual mean maxima and minima, and the resulting diurnal range for these same places :

TABLE II

ANNUAL MEAN MAXIMUM, ANNUAL MEAN MINIMUM, AND MEAN DAILY RANGES

<i>Stations.</i>	<i>Annual mean maz.</i>	<i>Annual mean min.</i>	<i>Mean daily range.</i>	<i>Stations.</i>	<i>Annual mean maz.</i>	<i>Annual mean min.</i>	<i>Mean daily range.</i>
Cape Town	71.8°	53.4°	18.4°	Umtata	75.7°	50.2°	25.5°
O'okiep	75.2°	50.8°	24.4°	Pretoria	78.1°	48.8°	29.3°
Mossel Bay	70.2°	56.4°	13.8°	Pietersburg	77.0°	49.8°	27.2°
Graaff-Reinet	78.0°	49.2°	28.8°	Salisbury	76.2°	53.1°	23.1°

The small diurnal range of $13.8^{\circ} F.$ at Mossel Bay is due to the equalizing influence of the sea, whilst the large range of $29.3^{\circ} F.$ at Pretoria is owing to its being built in a valley surrounded on all sides by kopjes, and the consequent undue heating by day and cooling by night.

Over the west and south-west the mean daily range is greater during the warmest month than during the coldest by about 5° , whereas over the rest of the country the reverse holds, the difference being slightly more than 5° in favour of the coldest months. This contrast is evidently due to the blanketing effect of cloud during the winter season in the west and south-west, whilst summer is the rainy period over the rest of the country. The increased range during winter is greatest, $14\cdot8^{\circ}$ at Stander-ton in the south of the Transvaal; whilst the summer excess is found to be greatest ($9\cdot9^{\circ}$) at Springbokfontein in Namaqualand.

Some of these peculiarities can be seen in the following Table III, which is primarily intended, however, to show the mean annual range of temperature; that is, the difference between the mean coldest and the mean warmest month at each station. This may be regarded in most cases as a measure of the increase of temperature from midwinter to midsummer, and of the variations to which plants and animals are liable to be subjected.

TABLE III
MEAN ANNUAL RANGES

<i>Station.</i>	<i>Warmest month.</i>	<i>Mean max. temp.</i>	<i>Mean min. temp.</i>	<i>Mean monthly temp.</i>	<i>Coldest month.</i>	<i>Mean max. temp.</i>	<i>Mean min. temp.</i>	<i>Mean monthly temp.</i>	<i>Mean annual range.</i>
Cape Town	Feb.	$81\cdot8^{\circ}$	$60\cdot3^{\circ}$	$71\cdot0^{\circ}$	July	$62\cdot6^{\circ}$	$47\cdot4^{\circ}$	$55\cdot0^{\circ}$	$16\cdot0^{\circ}$
O'okiep	Feb.	$85\cdot3^{\circ}$	$59\cdot1^{\circ}$	$72\cdot2^{\circ}$	July	$63\cdot4^{\circ}$	$43\cdot0^{\circ}$	$53\cdot2^{\circ}$	$19\cdot0^{\circ}$
Mossel Bay	Jan.	$75\cdot7^{\circ}$	$63\cdot8^{\circ}$	$69\cdot8^{\circ}$	July	$66\cdot3^{\circ}$	$49\cdot5^{\circ}$	$57\cdot9^{\circ}$	$11\cdot9^{\circ}$
Graaff-Reinet	Feb.	$87\cdot6^{\circ}$	$60\cdot5^{\circ}$	$74\cdot0^{\circ}$	July	$67\cdot9^{\circ}$	$36\cdot9^{\circ}$	$52\cdot4^{\circ}$	$21\cdot6^{\circ}$
Umtata	Feb.	$81\cdot2^{\circ}$	$60\cdot1^{\circ}$	$70\cdot6^{\circ}$	June	$70\cdot2^{\circ}$	$36\cdot8^{\circ}$	$53\cdot5^{\circ}$	$17\cdot1^{\circ}$
Pretoria	Jan.	$83\cdot8^{\circ}$	$59\cdot6^{\circ}$	$71\cdot7^{\circ}$	July	$68\cdot6^{\circ}$	$34\cdot8^{\circ}$	$51\cdot7^{\circ}$	$20\cdot0^{\circ}$
Pietersburg	Jan.	$81\cdot5^{\circ}$	$59\cdot9^{\circ}$	$70\cdot7^{\circ}$	July	$69\cdot0^{\circ}$	$36\cdot2^{\circ}$	$52\cdot6^{\circ}$	$18\cdot1^{\circ}$
Salisbury	Nov.	$80\cdot5^{\circ}$	$59\cdot3^{\circ}$	$69\cdot9^{\circ}$	July	$68\cdot9^{\circ}$	$42\cdot3^{\circ}$	$55\cdot6^{\circ}$	$14\cdot3^{\circ}$

The mean annual range shown in the last column has been obtained by subtracting the mean monthly temperature of the coldest from that of the warmest month. This shows that the most equable climate as regards temperature is met with on the coast, whilst stations on the Karroo, like Graaff-Reinet, are subject to much greater variation during the year than even places on the High

Veld. The latter fact may be explained by a relatively small amount of cloud over the Karroo during summer, enabling solar radiation to have a greater effect than over the High Veld, and consequently to raise the day temperatures in the south more than those further north and east. It may be assumed, however, as a general rule, that the greater the mean daily range the greater the mean annual range, other conditions being similar.

The comparatively small land area of this sub-continent enables the moderating influence of the surrounding oceans to be felt over practically the whole country. This, in conjunction with the elevated character of the interior, renders the climate of almost any part of South Africa much more temperate than that of stations in corresponding latitudes in the Northern Hemisphere. Thus the warmest station, Komati Poort, in lat. $25^{\circ} 26' S.$, has a mean annual temperature ($73.1^{\circ} F.$), corresponding with that of Cairo in $30^{\circ} N.$ lat. and practically the same as the mean summer temperature of Madrid; whilst the coolest station, Disa Head, in lat. $34^{\circ} S.$, has an annual temperature ($54.7^{\circ} F.$), similar to those of Pavia and Boulogne.

The mean annual temperature of all stations is $62.6^{\circ} F.$, about the same as that of Barcelona, Toulon, Naples, and the Riviera on the shores of the Mediterranean; slightly lower than the annual temperature of Sydney (New South Wales) and Melbourne, and about the same as the summer months in London.

On drawing the mean annual isotherms, after applying a correction for altitude, it is found that the lines run roughly parallel with the coast, and show an increase of temperature from the sea inland. It is also seen that the west coast is relatively cooler than the east coast, the former being washed by the cold waters of the Benguela current, whilst the warm Mozambique (or Agulhas) current raises the temperature of the east and south coasts as far as Simonstown, where the annual temperature is $64.7^{\circ} F.$ Without any correction for height, there is found to be an increase in temperature from west to

east along the parallels of latitude of about one degree (1° F.), for each degree of longitude; from north to south along the west coast, there is an increase of slightly more than 1° F. for each degree of latitude; along the south coast, from Cape Agulhas, the increase eastwards is only 0.4° F. per degree of longitude; whilst from East London to Durban the rate northwards is increased to about 1.5° F. for each degree of latitude. The coolest section of the country is found in Basutoland, where the annual mean is 58.7° F., the Orange Free State, the Northern Karroo, and the north-east of the Cape Colony being only a few tenths warmer on the mean of the year; the warmest section of the country is Natal (66.9° F.), Rhodesia coming next with an annual temperature of 66.6° F.

Seasons.

Over the southern hemisphere the seasons are the reverse of those in the northern hemisphere, the three warmest months, December—February, corresponding to the summer season of June—August in countries north of the equator. Considering the general march of temperature throughout the year, it is found that the monthly mean temperature curve (Fig. 12) is at the maximum (70.6° F.) in January and February; it then falls at first slowly in March, but rapidly in April, May, and June, to the minimum (53.0° F.) in July; after which it ascends more slowly to the maximum again. The maximum or day temperatures are highest (82.2° F.) in January, and decrease to the lowest (66.3° F.) in June, after which they rise again to the maximum in January. The minimum or night temperature curve falls from its highest value (59.1° F.) in February to its lowest point (39.4° F.) in July, then rises again till February. It will be noted that whilst the day temperatures are rising in July, the night temperatures are still falling, a state of affairs closely associated with a cold spell which affects the whole country about the middle of the month. Although the three months, December to February, constitute on the average the warmest period of the year, there are certain striking exceptions to this rule. Thus, the Cape Peninsula and

the south-west of the Cape Colony have the highest mean monthly temperatures from January to March, a lag of one month behind the greater part of the country, due mainly to the cool southerly winds decreasing in frequency and strength during March. Again, over Rhodesia the warmest period of the year is from October to December, a circumstance closely associated with the occurrence of the rainy season about the beginning of November. The highest mean monthly temperature there occurs either in October or November, according as the rains are early or late. At most coast stations the mean day temperatures, instead of beginning to rise in July, continue to fall till August or September ; the reason for this is not quite clear.

The equable nature of the climate of South Africa is well indicated by the comparatively small difference between the warmest and coldest months, thus the range is least (5.9°F.) at Port Nolloth on the west coast, and greatest (28.7°F.) at Fraserburg in the Northern Karroo. Generally the annual range increases from the coast inland, being mostly 10° – 12°F. at the coast and 20° – 25°F. over the less elevated portions of the High Veld as well as over the Karroo. These values are small compared with stations occupying positions in the European or American Continents, thus in the United States it ranges from 10° – 15°F. along the Pacific Coast to 55° – 65°F. over the north-eastern Rocky Mountain slope eastwards to Lake Superior.

Range of
tempera-
ture.

Temperatures of 100°F. have been recorded at most stations, with the exception of a few places on the more elevated portions of the High Veld, in Basutoland, &c.; whilst temperatures of 101° – 105°F. are of fairly common occurrence along the coast belt, being usually noted once or twice a year, and occasionally over the elevated interior. Temperatures of 106° – 115°F. are much less frequently observed, but do occur from time to time over the lower plateaus and the lowest western portions of the High Veld ; temperature rises to this extent mostly during the prevalence of hot, föhn-like winds

that are liable to blow at times from the elevated interior down to the lower levels on and near the coast.

Mean shade temperatures of 32° F. and under are of most frequent occurrence during June—August, particularly over the Northern Karroo, the north-east of the Cape Colony, and parts of Natal.

Severe frosts, capable of freezing standing water, are practically unknown along the coast, but are of fairly frequent occurrence in the interior. As a matter of fact, frost is liable to occur at inland stations during any month of the year, but more particularly from May to the middle of September, although killing frosts are apt to occur as early as March and as late as October. The danger of damage to fruit, &c., from this cause will be apparent when it is stated that the first almond blossoms open on the Karroo, on an average, on August 1, the peach on August 25, and the pear three to four weeks later. Hoar-frost, however, is not uncommon over the coastal districts, as from actual observation it has been found to occur, on an average, on seventeen days in the course of the year over the Cape Flats, in the neighbourhood of Cape Town. Over the Great Karroo there are about seventy days per annum on which ground-frost occurs; ninety-six in the north-east of the Cape Province, and sixty-three days at Bloemfontein. A great deal, however, depends on the situation of the station, whether on a hill or slope, or in a valley, as is shown by there being only five days, on an average, with frost at the Union Observatory, Johannesburg, situated on a ridge at an elevation of 5,925 feet; frosts are much more frequent in the adjoining valleys.

The extremes of temperature recorded over South Africa are 125° F. at Main in Tembuland, in January 1903, and 6° F. at Palmietfontein in the north-east of the Cape Colony, in lat. 30° 25' S., and long. 27° 33' E., at an altitude of 4,500 feet, after a severe snowstorm in June 1902.

(A table showing the average monthly temperatures of some of the principal towns in South Africa is appended.)

Rainfall.

The average rainfall varies enormously over the country,

Station.

Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Salisbury.	(Mean max.	78·0	76·7	77·3	77·0	73·0	68·9	73·9	78·3	82·2	80·5	79·0	76·2
	(Mean min.	59·9	59·2	57·9	53·9	47·3	42·3	46·9	51·0	57·1	59·3	59·4	53·1
Bulawayo.	(Mean max.	80·6	69·0	67·6	65·4	60·2	55·6	60·4	64·6	69·6	69·0	69·2	64·6
	(Mean min.	61·3	60·4	58·5	53·6	48·3	43·8	47·6	52·8	58·2	60·4	60·9	54·2
Pretoria.	(Mean max.	83·8	82·2	80·1	78·0	72·7	68·6	73·7	79·4	82·3	82·4	84·0	78·1
	(Mean min.	59·6	59·1	55·5	47·8	40·6	35·5	34·8	39·6	47·4	53·0	56·0	48·8
Johannesburg.	(Mean max.	71·7	70·6	67·8	62·9	56·7	52·6	51·7	56·7	63·4	69·2	71·8	63·5
	(Mean min.	75·1	73·4	71·2	68·2	63·3	59·3	59·8	70·2	72·4	73·2	74·8	68·9
Komatipoort.	(Mean max.	55·7	55·5	53·5	49·5	45·6	41·4	41·0	48·0	50·4	52·8	54·8	49·3
	(Mean min.	65·4	64·4	62·3	58·8	54·5	50·4	54·6	59·1	61·4	63·0	64·8	59·1
Durban.	(Mean max.	91·8	90·6	88·0	85·3	82·6	79·5	79·3	87·7	89·4	88·6	93·0	86·5
	(Mean min.	69·2	68·2	65·9	60·7	53·6	46·7	40·7	52·5	62·6	65·3	68·3	59·8
Maritzburg.	(Mean max.	80·5	79·4	77·0	73·0	68·1	63·1	62·9	67·4	76·0	76·9	80·6	73·1
	(Mean min.	85·2	85·3	82·7	79·8	76·0	73·8	74·8	78·7	80·1	81·3	84·1	79·9
Durban.	(Mean max.	61·4	61·5	60·2	57·7	47·8	41·3	42·4	51·6	54·7	56·9	59·6	53·4
	(Mean min.	73·4	73·4	71·4	67·8	61·9	57·6	58·6	65·2	67·8	69·1	71·8	66·6
Kimberley.	(Mean max.	84·9	85·0	84·3	81·5	77·5	75·5	75·8	81·2	83·4	81·2	83·4	79·9
	(Mean min.	68·2	68·3	67·8	63·3	58·2	54·3	53·8	58·7	61·6	64·3	66·2	61·7
Hanover.	(Mean max.	76·6	76·6	76·0	72·4	67·8	64·6	66·0	67·6	69·7	72·8	74·8	70·8
	(Mean min.	90·5	89·8	84·6	76·2	68·6	63·6	64·6	70·9	85·0	90·2	91·9	79·6
Cape Town.	(Mean max.	61·0	60·6	59·4	51·0	43·0	36·7	36·5	40·1	45·2	56·2	59·5	50·1
	(Mean min.	75·8	75·2	72·0	63·6	55·8	50·2	50·6	62·4	68·2	73·2	75·7	64·8
Port Elizabeth.	(Mean max.	85·2	84·5	78·7	72·1	65·0	58·9	59·4	68·6	73·7	78·4	84·9	72·7
	(Mean min.	53·7	54·2	49·4	42·5	35·1	26·9	26·4	36·6	42·5	48·2	53·5	41·6
East London.	(Mean max.	69·4	69·4	64·0	57·3	50·0	42·9	47·7	52·4	58·1	63·3	69·2	57·2
	(Mean min.	78·5	79·2	77·4	71·7	67·1	62·6	62·4	64·8	68·7	72·7	76·1	70·4
Bloemfontein.	(Mean max.	60·1	60·2	58·7	54·4	50·7	48·3	47·2	48·1	49·3	55·6	58·5	53·6
	(Mean min.	69·3	69·7	68·0	63·1	58·9	55·5	54·8	57·0	60·7	64·2	67·3	62·0
Durban.	(Mean max.	75·4	75·8	75·2	72·4	69·9	67·1	67·4	66·6	68·3	71·1	73·8	70·8
	(Mean min.	64·4	63·8	62·8	58·6	54·4	51·1	50·3	51·4	55·7	59·1	61·6	57·2
Port Elizabeth.	(Mean max.	69·9	69·8	69·0	65·5	62·2	59·1	58·8	59·3	59·7	65·1	67·7	64·0
	(Mean min.	75·0	74·3	73·9	72·8	70·9	70·3	69·5	68·6	69·7	71·5	73·8	71·7
East London.	(Mean max.	64·9	64·8	63·5	59·7	54·0	49·7	52·3	55·1	57·8	60·2	63·2	58·0
	(Mean min.	70·0	69·5	68·7	66·2	62·4	60·0	60·9	61·8	63·8	65·8	68·5	64·8
Bloemfontein.	(Mean max.	84·6	82·9	78·3	72·4	65·6	61·9	66·9	73·2	77·2	81·5	85·3	74·2
	(Mean min.	60·3	59·5	55·1	47·4	40·3	33·2	36·9	45·0	49·4	54·0	50·5	47·8
Durban.	(Mean max.	72·5	71·2	66·7	59·9	53·0	47·6	51·9	59·1	63·1	67·7	71·9	61·0
	(Mean min.												

ranging from over 200 inches in the mountainous district of the south-west of the Cape Province (Wemmer's Hoek and Berg River areas) to 2·5 inches at Port Nolloth, and 0·3 inches at Walfish Bay. In the east of the Cape Province the wettest station is Evelyn Valley (lat. $32^{\circ} 35' S.$, long. $27^{\circ} 33' E.$), where at an elevation of 4,200 feet the normal annual rainfall is about 62 inches. Over the Transvaal the amounts vary between 82 inches at Woodbush Forest, in the Zoutpansberg District (lat. $23^{\circ} 51' S.$, long. $29^{\circ} 58' E.$), at an elevation of 4,900 feet, to 18·5 inches at Christiana in the extreme south-west of the province. Over the Orange Free State it is much more uniform, varying from 35 inches in the eastern portion to 18 inches at Jacobsdal in the west; over Rhodesia, from 65 inches at Helvetia (Melsetter) in the east in lat. $20^{\circ} 20' S.$, long. $32^{\circ} 40' E.$, to 14 inches at Tuli in the Limpopo Valley at an altitude of 1,750 feet; in Natal (including Zululand) it ranges from 53 inches at Eshowe ($28^{\circ} 49' S.$, $31^{\circ} 29' E.$), and 51 inches at Qudeni (lat. $28^{\circ} 37' S.$, long. $30^{\circ} 40' E.$, approximately) at an elevation of 5,680 feet, to 25·5 inches at Weenen, (2,840 feet) in lat. $28^{\circ} 52' S.$, long. $30^{\circ} 6' E.$ It is therefore obvious that these widely varying quantities combined with the variations in temperature must cause a considerable diversity of climate over the various parts of the country. Not only does the quantity of rainfall vary considerably over widely separated parts of the country, but stations within a few miles of each other show marked contrasts in the amount of rainfall occurring during the year. Thus the Royal Observatory, near Cape Town, has an annual amount of 25·6 inches, and Bishops court, about three miles distant, averages 55·2 inches. Again, George, on the south coast, has a normal annual fall of 31 inches, whilst Ezeljagt, about nine miles to the north-east, but on the other (i.e. the north) side of the Outeniqua Mountains, receives only about 13 inches per annum.

Speaking generally, however, the mean annual rainfall decreases from east to west and from south to north.

Thus, a rainfall of over 40 inches occurs over a narrow

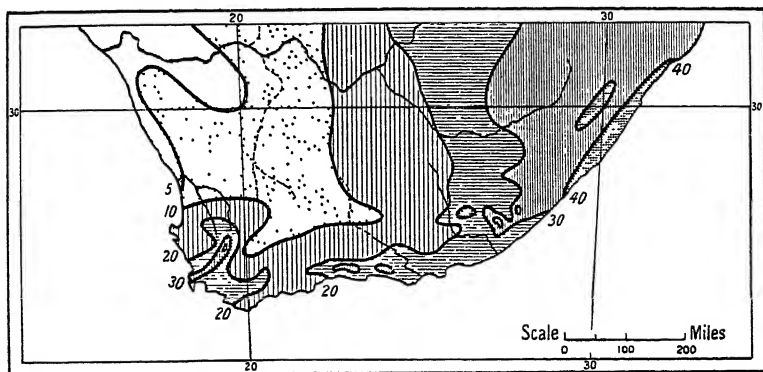


FIG. 13. Mean Annual Rainfall.

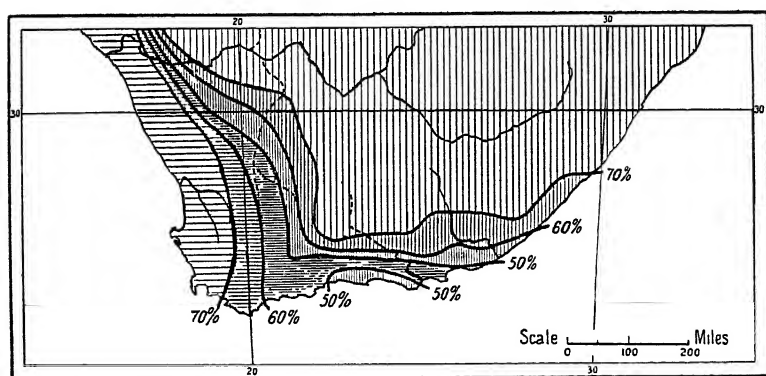


FIG. 14. Proportions of rainfall in summer (perpendicular lines) and winter (horizontal lines).

strip of country along the east coast belt between Port St. John's and Durban, and portions of Zululand and Swaziland have average annual amounts of about 50 inches. The amount of precipitation then decreases in a general way inland to the Drakensberg and the eastern escarpment of the innermost plateau ; thus, Durban (260 feet) has 41 inches ; New Hanover (2,590 feet), 36 inches ; Dundee (4,100 feet), 31 inches. Along the top of the eastern escarpment of the Transvaal and Rhodesia, however, as well as in the mountain regions of Natal, a marked increase takes place in the amount of moisture deposited, the annual fall exceeding 45 inches in the north-easterly and south-easterly parts of the plateau : the isohyets of 45, 40, and 35 inches run in a general north and south direction along the eastern side of the plateau, and are closely crowded together.

Position of isohyets. The 30-inch line in Rhodesia starts in about 16° S. lat. and 33° E. long., and at first sweeps in a west-south-westerly direction to the neighbourhood of Sinoia, then turns in a general south-easterly direction to 21° S. lat. and 33° E. long.; over the Transvaal this line oscillates east and west of the 30th meridian, then runs along the western side of the Basuto Highlands in a general south-westerly direction, and turning south in the neighbourhood of Wepener reaches the coast of Cape Colony between East London and Port Alfred. In Rhodesia a second 30-inch line makes its appearance, stretching in a general way from NE. to SW., parallel with the south bank of the Zambezi between the longitudes of Zumbo and Livingstone. The 25-inch isohyet is found at a much greater distance from the 30-inch line running in a general north-east to south-west direction, practically through the centres of the Transvaal and the Orange Free State ; while the 20-inch isohyet lies a little to the east of the western boundaries of these two provinces, running south to the neighbourhood of Port Elizabeth. The isohyet of 25 inches in Rhodesia extends at first in a general north-east to south-west direction, roughly parallel with and equidistant from the two 30-inch lines, but forms a wide loop in the south-

west, where it runs a short distance to the south of Bulawayo and turns north-east to the neighbourhood of Gwelo, whence it extends south-eastwards along the valley of the Nuanetsi, a tributary of the Limpopo. The 15-inch line of equal rainfall in Rhodesia stretches westwards along the northern side of the Macloutsie and Limpopo Rivers from Macloutsie to 31° E. long. This line, which may be considered as roughly separating the semi-arid from the more favoured regions, may be approximately indicated as starting on the 20th meridian in about $23\frac{1}{2}^{\circ}$ S., and sweeping in a general south-easterly direction to the neighbourhood of Campbell (west of Kimberley); thence in a south-south-easterly direction to the neighbourhood of the Fish River to the north of Grahamstown; thence westwards through the Lange Kloof on the north side of the first mountain range parallel with the south coast to the neighbourhood of Worcester; thence up the Hex River Valley to the foot of the Matroosberg; then northwards parallel with the Cedarberg to the neighbourhood of Clanwilliam and afterwards southwards west of Piquetberg to practically the northern shores of Table Bay. To the north and west of this line agriculture requires to be carried on with the assistance of irrigation and the methods of so-called 'dry-land farming'. The most arid part of the country is that part of the Cape Colony west of the Karree and Kamies Bergen between the Olifant and Orange Rivers, and including Great Bushmanland, to the east of the Namaqualand Plateau; here the annual rainfall is less than 5 inches, whilst on the plateau it rises to about 7-8 inches. Another exceptionally dry area is that known as 'The Ghoup' in the west of the Great Karroo, where the rainfall is reduced to about 5 inches.

The wettest portions are the Cape Peninsula, with an average of about 38 inches; and the south-west, which includes the mountainous areas of the Berg River and Wemmer's Hock, already mentioned as having the largest rainfall of all South Africa. In the Cape Peninsula the east side is found to be much wetter than the west or north,

although the excessive precipitation does not extend very far from the neighbourhood of the Table Mountain Range; the rainfall varies considerably over even this limited area, being 87 inches at Maclear's Beacon near the top of Table Mountain, and falling to less than 20 inches at Green Point on the south shore of Table Bay. The driest portion of the south coast is the comparatively flat area between Cape Agulhas and Mossel Bay, where the rainfall is less than 20 inches per annum. East of Mossel Bay, however, the annual fall is much heavier along the coast-belt, exceeding 25 inches at most stations and rising in parts of the Knysna district to over 40 inches.

Seasonal
rainfall.

A composite curve of the average monthly rainfall over South Africa shows that precipitation is at its maximum during March, after which it falls to the minimum in July, rising again to a secondary maximum in November, about three-fifths falling during the six warmest months, October—March. The seasonal distribution varies considerably, however, over different parts of the country, a comparatively small area in the west and south having the major proportion of its total precipitation during the winter months, whilst a still smaller area, along the south coast between Mossel Bay and Cape St. Francis and stretching inland to Uniondale in the Southern Karroo, has a regular or all-the-year-round rainfall; the greater part of the country therefore comes under the influence of a summer rainfall. The 50-per-cent. line separating the summer and winter rainfall areas starts on the west coast about 25° S. lat. and runs in a general south-south-easterly direction to the neighbourhood of Ladismith (lat. 33° 29' S., long. 21° 17' E.), after which it turns in a general easterly direction practically parallel with the coast, reaching the coast about Port Alfred (lat. 33° 34' S., long. 26° 54' E.).

Examples of these three types of seasonal distribution are given in the table on the next page.

Thunder-
storms.

The summer rainfall area derives the greater part of its precipitation from thunderstorms due to convectional action consequent on intense solar radiation. These storms attain their maximum frequency in February and

reach a minimum in June, there being a secondary maximum in October. It will be noted that the thunderstorm-frequency curve is throughout a month in advance of the rainfall curve, thus indicating that there must be some other cause giving rise to the heavy rainfall in March and November, or at least reinforcing the precipitation caused by thunderstorms. The frequency and intensity of these storms increases from west to east and inland from south to north; thus at the Royal Observatory in the Cape Peninsula there is an average of 13 days per annum on which lightning occurs; at Blaauwkrantz, near the south coast in the Knysna district, there is an average of 16 days; at Colonies Plaats in the Great Karroo, 27 days; and at Johannesburg, 111 days; at

<i>Type.</i>	<i>Place.</i>	<i>Total Yearly rainfall.</i>	<i>Summer rainfall.</i>	<i>Winter rainfall.</i>	<i>Percentage of total in summer.</i>	<i>Percentage of total in winter.</i>
		<i>in.</i>	<i>in.</i>	<i>in.</i>		
Winter rainfall	Royal Observatory (Cape Town)	25·65	5·95	19·70	23	77
All the year round	Knysna	28·09	14·62	13·47	52	48
Summer rainfall	East London	34·97	21·67	13·30	62	38
" "	Bloemfontein	22·44	17·20	5·24	77	23
" "	Pretoria	29·44	26·38	3·06	90	10
" "	Durban	40·83	28·61	12·22	70	30
" "	Salisbury	32·78	30·77	2·01	94	6

Durban the average is 23 days, and at Ixopo, further inland, 34 days. Lightning is much more vivid and destructive than in England, several people or cattle being occasionally killed by one flash, while patches of grass are sometimes set on fire from this cause. In the Transvaal alone four years' returns show an average of fifty-three people killed by lightning, twelve being of European and forty-one of native origin.

Precipitation during these storms frequently assumes the form of hail. This occurs mostly in the form of graupel, or soft hail, along the coastal districts; but 'true hail' is of common occurrence in the interior, destroying crops and fruit, even piercing galvanized iron roofs and occasionally killing sheep. The stones are sometimes of considerable size, some having been found to weigh $5\frac{1}{2}$ oz.,

Hail-
storms.

while one actually measured $4\frac{1}{2} \times 3\frac{1}{2} \times 1\frac{1}{8}$ inches. Hail has been observed to lie to a depth of as much as 3 feet in places where it has drifted, and may last a week before being melted.

Destructive hailstorms are of most frequent occurrence in the middle districts of Natal, rendering fruit-growing a very precarious pursuit, in the south-east of the Transvaal and in Kaffraria; in parts of the last area it is usual to protect windows of houses from destruction by means of wire-netting.

Snow.

Snow is liable to occur three or four times in the course of the year at places exceeding 3,000 feet, although it is much more frequently seen on the mountains. Only on very rare occasions is snow to be met with on the flats along the coast, although the coastal mountain ranges are frequently covered during winter. Snow may be seen on the mountain-tops from the end of March to the end of September, but has been noted as late as the last week in December. Although usually occurring over very limited areas, there are occasions on which a large extent of country is affected, as in 1853, 1881, 1902, and 1909, chiefly over the eastern portions of the High Veld, in the neighbourhood of the Drakensberg, extending at times to the Damnamana plateau in German South-West Africa, as in June of 1902. As indicating the comparatively infrequent occurrence of this form of precipitation over the High Veld, in only eleven years in fifty-seven has snow been noted in the Transvaal; whilst on only seven occasions in forty-three years has snow been seen on the face of Table Mountain in the Cape Peninsula.

Winds,
Relief,
and
Rainfall.

Most of the leading features of the distribution of rainfall over South Africa may be readily understood from a consideration of the relation of the principal moisture-bearing winds to the topography of the country, particularly the mountain ranges or steep escarpments of the plateaus; the distance of any station from the sea; and its nearness to the usual paths of barometric depressions: while convectional activity contributes largely to the precipitation over the summer rainfall

area. Thus, in the west the chief rain-bringing winds are from the north-west (the prevailing direction, however, being southerly throughout the year); at Port Elizabeth, from the south-west; at East London, from north-east and south-west, but chiefly the latter, as is also the case at Durban; at Bulawayo the main directions appear to be east, south-east, and south. Over the winter rainfall area the north-westerly winds pass from warmer to colder latitudes, and are further compelled to part with the greater part of their moisture by the elevated ground forming the western boundary of the internal plateaus. They thus pass over the greater part of the country as dry winds, as owing to their originating in the coldest part of the Atlantic, they are unable to absorb any great quantity of moisture or to continue as rain-bearing winds for any great distance inland; hence the small area affected by winter rains.

The area of 'constant rains' is watered chiefly by the south-westerly winds in the rear of the depressions which mainly affect this part of the coast, coming in from the south-west and passing off to the north-east. These winds being deprived of the greater part of their moisture by the first coast range of mountains are unable to cause any heavy precipitation over the Karroos. Moreover, as they are advancing from cooler to warmer latitudes, they themselves become warmer and hence relatively drier, so that they can part with some of the remainder of their moisture only on rising over the mountain ranges or escarpments further inland. Hence it is to be expected that the southern edges of the plateaus will receive a heavier precipitation than the plains further inland. These winds constitute the main precipitating agent of the moisture along the south-east and east coasts.

The greater part of the interior of the area of 'summer rains' owes its rainfall principally to the north-easterly and easterly winds, which coming from the warm, moist latitudes of the Indian Ocean and passing to higher and cooler latitudes, are able to carry their moisture further south and further inland than the south-westerly

winds. Whenever these winds are forced to ascend, as in passing from a lower to a higher plateau, either precipitation will take place in the form of rain or a mist-belt along the edge will be formed, as occurs in Natal and over the eastern slopes of the High Veld. As these winds must be gradually cooled on advancing southwards, they ought to be fairly moist even on reaching the ocean again after crossing the interior. It may be necessary for them to be further cooled by expansion during ascension in such secondary disturbances as give rise to thunderstorms, &c., before they can deposit moisture in the more inland and more southerly parts of the country, a condition possibly largely contributed to by the cool, dry, south-westerly winds. This rainfall is still further increased by occasional deposits from south-east winds and thunderstorms from the north-west. It is therefore evident that along the outer edges of the various plateaus there ought to be a comparatively heavy rainfall, rapidly decreasing inland until the effect of the 'uplift' is lost, when the rainfall is more uniformly distributed; whilst any deep valleys cut by rivers in the plateaus and escarpments will receive but little moisture directly from the winds, but are dependent on convectional action giving rise to thunderstorms. Hence such valleys are apt to be hot in summer and dry, as is the case at Weenen in Natal, where the mean annual rainfall is only 25·5 inches. Port Nolloth, notwithstanding its coastal position, owes its exceptionally small rainfall to the presence of a permanent anticyclone, to westward, close to the coast, the winds from which are dry, whilst this high pressure area prevents depressions passing on to the land, so that Port Nolloth lies out of the track of the disturbances which affect the southern and eastern parts of the country. As showing the dry character of the winds over Nama-land, it may be stated that although there is a rise of 1,234 feet in 6 miles between Anenous (1,770 feet) at the base of the plateau and Klipfontein (3,004 feet) near the top, the increase in precipitation is very small, Anenous having 5 inches and Klipfontein 7·9 inches.

Again, during the winter season, the centre of South Africa is occupied by a relatively weak anticyclone, the winds from which blow outwards towards the coast, causing the dry season over the interior and reducing the precipitation in the east. On the other hand, during summer, pressure is lowest over the interior, so that the moist winds from the Indian and Southern Oceans are able to penetrate to the interior. It can therefore be readily understood how these easterly winds over the summer rainfall area ought to be regarded as the moisture-introducing winds, and the cold south-westerly winds as a precipitating agent. 'The Ghoup' owes its small rainfall to both the north-westerly and south-westerly winds having been deprived of their moisture before arriving there by the mountains surrounding it on the north, west, and south sides.

The weather of South Africa, more particularly in the south, is largely due to a series of moving anticyclones passing from west to east, with their associated inverted V-shaped depressions, and to 'secondaries'. Some of the heaviest rains (and occasionally snow) in Natal are derived from Indian Ocean cyclones coming in from the north-east and recurving about the latitude of Durban. Practically the whole of the south and east coast belts are subject to occasional heavy floods, due either to rains of comparatively short duration but of great intensity (4 inches or over per hour), or more prolonged rains totalling 10-17 inches at times in twenty-four hours, both in the Cape Colony and Natal. Heavy falls of short duration occur over practically the whole of South Africa, the intensity at times reaching 10 inches per hour for ten minutes or more.

Unfortunately the greater part of the interior is subject to drought from time to time, should the spring rains fail, a state of affairs liable to be accentuated by a shortage of precipitation during the preceding autumn, as was the case in the recent drought of 1912.

Evaporation from free water surfaces is very large over the whole country, being on the average in the ratio

of about 2·5 inches of evaporation to one inch of rainfall, as compared with an approximate ratio in England of 1·5 inch of rainfall to 1 inch of evaporation.

Föhn
winds.

Hot, dry, föhn-like winds blow all along the coast belt from Walfish Bay to Durban, particularly during the winter months in the west and south and at the latter end of winter and spring in Natal, raising the temperature to over 100° and causing a practical inversion of the seasons at times at Port Nolloth.

Dust-
storms.

The most disagreeable feature of the South African climate is undoubtedly to be found in the frequent dust-storms which are met with all over the country from about the end of winter, when the anticyclone is beginning to break up, during spring and summer to the beginning of autumn. Fortunately they do not last long and are usually succeeded—over the higher plateaus at least—by rain, mostly from thunderstorms.

Cloud and
sunshine.

The mean annual amount of cloud is comparatively low, approximately 38 per cent. for the whole country, being at the maximum in October and the minimum in July. It is cloudiest along the south coast, where it averages 48 per cent., and the skies are clearest over the northern border of the Cape Colony, where the mean amount is only 24 per cent. Generally speaking, July is both the clearest and the driest month of the year. The chief exceptions to this broad statement are the occurrence of the minimum of cloud and of rainfall in January along the west coast, in February over the Cape Peninsula, and in June at Durban; whilst at Johannesburg the clearest days are in August and the least rainfall in June. The mean daily duration of sunshine throughout the year is greatest over the High Veld, amounting to 9·4 hours per day at Kimberley and 8·7 at Johannesburg, being 78 and 72 per cent. respectively of the optima; over the Cape Peninsula the average is 7·5 hours per day or 65 per cent. of the total possible, whilst at Stutterheim in the south-east of the Cape Colony it falls to 6·6 hours per diem. The highest percentage of sunshine over the Cape Peninsula (79 per cent.) occurs in December,



PLATE III (a). UMUNDUSI RIVER, PIETERMARITZBURG



PLATE III (b). CHAPMAN'S PEAK, HOUT BAY (CLOUDS OVER
MOUNTAINS)

(High Commissioner for South Africa)



and the lowest (51 per cent.) in June and July ; whereas in Johannesburg, the corresponding values are 89 per cent. in August and 58 per cent. in January and February ; and at Kimberley the largest proportion of duration of possible sunshine is 85 per cent. in June and 70 per cent. in February. The sunshine curve is practically the inverse of the cloud curve at these stations. At Johannesburg there is an average of only six sunless days in the course of the year, and at Kimberley this is reduced to less than three. It will therefore be seen that the country is well entitled to the description of 'sunny' South Africa.

[See Alexander Knox, *The Climate of the Continent of Africa*, Cambridge, 1911 ; A. G. Howard, 'The Rainfall of South Africa,' in *Trans. R. S. South Africa*, 1910, pp. 363-90, and other papers ; *Science in South Africa*, Cape Town, 1905 ; A. Buchan, *Rainfall of South Africa*, Cape Town, 1897.]

CHAPTER III

VEGETATION

BY PROFESSOR R. H. YAPP

It is well known that the character of the natural vegetation of any region, and also to a considerable extent the crops which can be cultivated, are largely determined by climate. Soil usually plays a subordinate, but none the less an important part. Speaking broadly, the main types of vegetation (forest, desert, &c.) are dependent on climatic factors, soil factors being more frequently responsible for local differences or developments. Topography is important chiefly by reason of its effect on climate. Of all the factors summed up in the term climate, rainfall has probably the greatest influence on vegetation. Nowhere is this more strikingly seen than in South Africa.

A considerable portion of the rainfall in South Africa is intercepted by the high mountains, which fringe the central table-land, and this tends to increase the general dryness of the climate, especially in the interior. Not only does the mean annual amount of the rainfall vary considerably

Climatic
control.

(as from 86.8 inches on Table Mountain to 0.3 inches at Walfish Bay), but also its distribution throughout the year. In some parts, e.g. the west and south-west, the bulk of the rain falls during the winter months ; in others, e.g. the centre and east, during the summer. Long periodic droughts are frequent, and these, especially when they occur in summer, effectually prevent the development of a luxuriant type of vegetation, even in districts where the total annual rainfall is considerable. Briefly, South Africa is for the most part a country in which, though there are many varieties of climate, the vegetation has to contend, at least periodically, with a scarcity of water. The severity of the climate in this respect impresses itself on the vegetation, which not only lacks luxuriance, but consists largely of 'xerophytes', i.e. plants possessing structural or other peculiarities which enable them to conserve their water-supply. Some of these peculiarities will be referred to later ; they include innumerable devices which facilitate both the obtaining and also the retaining of water by the plant. It is not too much to say that the question of water-supply is the most serious problem which the native plants of South Africa have to encounter.

The vegetation, however, is by no means uniform over the whole of British South Africa, but varies in different parts with every variation of climate and soil. Here we find a true desert, supporting only the scantiest of vegetation ; there wide stretches of grassy steppe, or of country reminiscent of English park scenery ; while only in a few favoured spots do we find any approach to a luxuriant forest vegetation. During the greater part of the year the prevalent hues of the vegetation are dull greyish-greens, greys, and even browns, rather than the vivid greens familiar to dwellers in more favoured climes.

Regional
distribu-
tion.

Though South Africa still presents an enormous and attractive field for botanical research, the labours of numerous botanists have resulted in the accumulation of much valuable knowledge of its vegetation, mainly as yet from the systematic and geographical points of view.

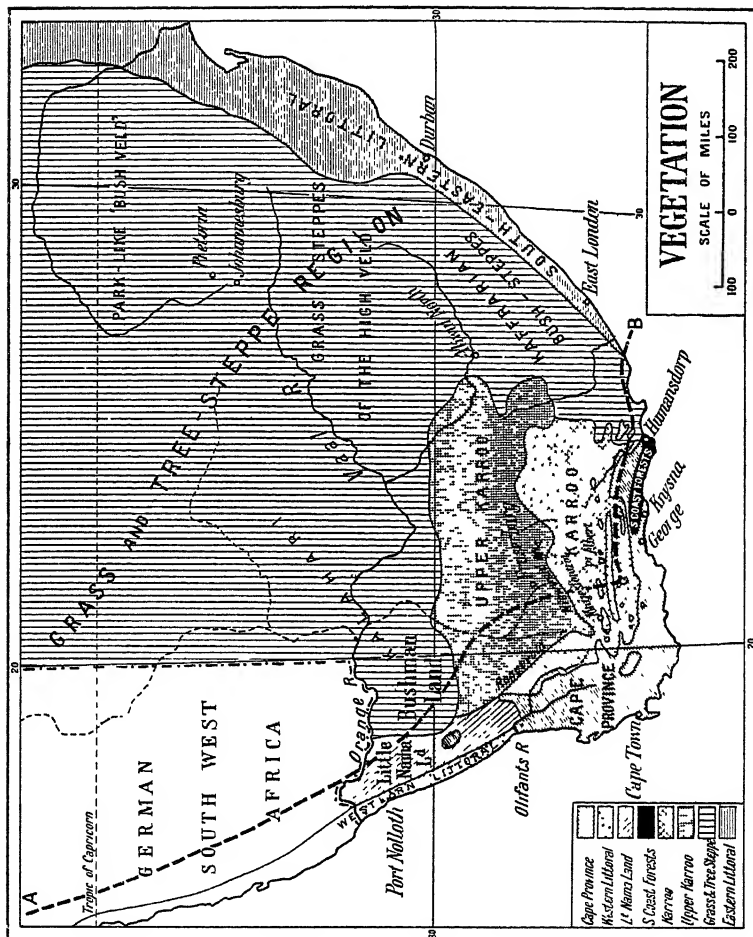


Fig. 15. Vegetation of South Africa.

As a result of the botanical explorations hitherto carried out, it is possible to divide the country into more or less definite floral regions or phyto-geographical provinces. Each possesses as a rule a fairly distinct climate of its own, and in consequence one or more characteristic types of vegetation. These floral regions may now be considered separately,¹ the coastal provinces first, afterwards those of the interior.

The Cape
Province.

The south-west corner of Cape Colony,² including the area northwards as far as the Bokkeveld Mountains, and eastwards along the south coast to Humansdorp, is botanically very different from the rest of South Africa. Its flora is also the best known, so it affords a good starting-point.

The total annual rainfall is by no means deficient, the average for the district being about 29·6 inches, though it varies greatly according to locality. But most of the rain falls during the winter (May to October), when the temperature, though mild, is still relatively low. The summer is the dry season, and long droughts regularly recur. Thus the vegetative growing season is compelled to be coincident with the cooler winter months. These climatic conditions have resulted in the production of a peculiar and characteristic type of vegetation. This may be termed 'macchia', from its general resemblance to the macchia of Corsica and other Mediterranean countries. The dominant plants of the macchia are evergreen shrubs some 3 to 6 feet high, usually with small, stiff, leathery leaves. These leaves are essentially 'xerophytic' in character, i.e. they are constructed in such a way as to prevent excessive loss of water. Between the shrubs are many smaller plants, large numbers of which possess bulbs, tubers, or other subterranean organs which store up quantities of water and food substances. On the approach of the dry season the aerial parts wither

¹ The classification adopted here is that proposed by Dr. Marloth in his important work, *Die Kapflora*.

² [The political Cape Province may for present purposes be thus distinguished from the botanical.]

and die, the plants surviving by means of their underground parts. Others have evergreen, fleshy, water-storing leaves or stems above ground; but though such succulent plants are frequent, they do not form as marked a feature of the vegetation as elsewhere in South Africa.

These features—the generally xerophytic nature of the vegetation; the dominance of stiff-leaved evergreen shrubs; the frequency of bulbous, tuberous, and to a less extent of succulent plants—are characteristic also of other parts of the world where the climate is similar. Such are the Mediterranean region and parts of California, Chile, and South Australia, all of which have more or less mild, rainy winters and dry summers. The *macchia* is widely spread in the south-west of Cape Colony, being especially well developed on the kopjes and foot-hills. But though dominant, it is not the only kind of natural vegetation occurring in the Cape Province. The sandy plains support a dwarf, heath-like vegetation, while marshy hollows, stream margins, mountain ravines, mountain summits, &c., all possess their own peculiar vegetation.

It is an interesting fact that though the *macchia* of South Africa closely resembles in appearance that of climatically similar areas in other parts of the world, the plants composing it are totally different. Probably not a single native species is common, for instance, to the *macchia* of South Africa and that of the Mediterranean region. Even the families of plants are largely different. The Cape Province in fact has a highly peculiar flora which, so far as family relationships are concerned, finds its nearest allies in the flora of South-West Australia. As regards the dominant families of plants, there is far greater affinity between the Cape Province and South-West Australia than between the former and the other floral provinces of South Africa. This serves to emphasize the fact that while climate and soil determine the type of vegetation, the actual systematic composition of the flora represented in the vegetation is dependent on quite different causes. Such causes are the power which plants

possess, in varying degrees, of migration (usually when in the seed condition), and of establishing themselves in new areas. Frequently the plants become modified in form, &c., subsequently to migration.

Of the peculiar families especially characteristic of the Cape Province only a few need be mentioned. The Proteaceae, to which belong many of the evergreen shrubs of the Cape macchia, are represented by 262 species. Among them are the well-known silver tree (*Leucadendron argenteum*) of the Cape Peninsula, the sugar bush (*Protea mellifera*), and others. The Restionaceae, a family of grass-like plants which largely take the place of true grasses in this region, though many of the latter occur as well. Most of the known species of these two families are found either in the Cape Province or in South-west Australia. The Ericaceae (heath family) are very numerous and often strikingly beautiful. Of the genus *Erica* alone there are 456 species. Others are the Bruniaceae, Rutaceae, and Iridaceae. The latter are monocotyledones with underground storage organs. South Africa as a whole is extraordinarily rich in tuberous and bulbous monocotyledones, many of which have beautiful flowers. Large numbers are grown as ornamental plants in European gardens.

The
western
littoral.

An arid strip of sandy desert—the only true desert in South Africa—constitutes the western littoral, lying between the sea and the western edge of the central tableland. It extends from Olifant's River northwards into German South-west Africa. The mean annual rainfall is very small, e.g. 0·3 inches at Walfish Bay, and 2·5 inches at Port Nolloth. The result of this deficiency of rainfall is a very scanty, intensely xerophytic vegetation. The plants are stunted and dwarfed, and nowhere form a continuous covering to the earth. Here and there considerable areas are practically devoid of vegetation. The plants include various desert grasses and succulents: the naras (*Acanthosicyos horrida*), a leafless plant with edible fruit, belonging to the gourd family; the inflammable candle bush (*Sarcocaulon Burmanni*), and in one or two spots the most remarkable of all, the unique

gymnosperm, *Welwitschia mirabilis*, which during a long lifetime only produces two pairs of leaves.

The western littoral and the greater part of the Cape Province lie within the area of winter rains. Towards the eastern extension of the latter, however, the rainfall becomes more equally distributed throughout the year, and the summer droughts decrease in severity. As the climate along the south coast thus gradually changes, the bush increases in height and size, culminating in a small tract of luxuriant woodland vegetation in the Knysna district. The forests are developed for the most part on the southern slopes of the Outeniqua and Zitzikamma Mountains and the lands immediately adjoining them, between George and Humansdorp. The climate is here fairly uniform throughout the year. The temperature is mild, the rainfall considerable (e.g. 35·4 inches at George), and both summer and winter are moist. For South Africa the conditions are unusually favourable to plant life, hence the formation of this small area of 'temperate rain forest'. The tallest trees are the two yellow-woods, *Podocarpus elongata* and *P. Thunbergii*. The former sometimes reaches a height of 130 feet. Both of these, and also the stinkwood (*Ocotea bullata*) furnish valuable timber. The black ironwood (*Olea laurifolia*) is the commonest tree; its wood is used for wagon-making, but is excessively hard. Under the trees is a profusion of ferns and other shade-loving plants, while numbers of orchids and ferns are found growing on the trunks and branches of the trees themselves. Climbers (especially *Cissus Capensis*) are also abundant.

The south-eastern littoral is a narrow strip of low-lying land beginning at East London, and occupying the south-east coast of Cape Colony and the east coast of Natal. The climate is subtropical, and more than 60 per cent. of the total rainfall occurs during the summer months. The vegetation is more tropical in character than that previously considered. Mangrove swamps occur in some of the river estuaries, two species of palms are found, and nine species of cycads. The families so characteristic of the

Cape Province (Proteaceae, &c.) are but poorly represented, while the Rubiaceae, Asclepiadaceae, and others more typical of the African and Indian tropics, are abundant. Many tropical economic plants, too, such as the sugar-cane, tea, banana, pine-apple, and mango, are cultivated with success. This province is probably to a large extent a southern and maritime extension of the great tropical African region.

The
interior
provinces.

So far the coastal provinces have been briefly considered. We must now turn to those which occupy the more elevated interior of British South Africa. These are two in number, and constitute a vast upland area of steppe country of varied nature, known to colonists as 'the Veld'. Here again rainfall plays the part of a master factor in determining the character of the vegetation. Broadly speaking, the line separating these two provinces may be drawn from Little Bushman Land in the north-west nearly to Aliwal North in the east, thence south to Humansdorp. We have then (a) the central region, to the west and south of the line, a semi-desert area of dwarf shrub- and succulent-steppe. It includes the Karroo and allied areas; and (b) to the north and east of the line an extensive area of grass- or tree-steppe, extending far northwards into the tropics.

The
central
province.

The central province comprises the Karroo, most of which lies to the south of the Roggeveld and Nieuweveld Mountains; the Upper Karroo (mostly above 4,000 feet) to the north of these ranges, and Little Nama Land as an extension to the north-west. The whole province is situated in Cape Colony. Though less arid than the western littoral, the central province is everywhere a region of low rainfall. Thus Beaufort West has about 9.7 inches, Prince Albert 11.4 inches, and some parts even less. The rains too are very uncertain, and occasionally even a whole year may pass without rain. In the Upper Karroo snow falls abundantly in the mountains, and ice is frequently formed even on the plains. It is thus no matter for wonder that the vegetation should be everywhere of a semi-desert character, or

that plants other than pronounced xerophytes should be unable to establish themselves. Small trees, such as the thorny *Acacia horrida*, and a few others, fringe the mostly dry river beds of the Karroo, elsewhere they are practically absent. The greater part of the country supports only a sparse and incomplete covering of stunted, skeleton-like bushes (about 1–3 feet high) or smaller plants, coloured grey or brown like the stones. Thorny plants, succulents, bulbous, and tuberous plants abound. On the advent of the rains innumerable tiny annuals spring up everywhere. Within a few weeks they have grown to maturity and have produced flowers, fruits, and seeds. As the effect of the rain passes off, these ephemeral plants wither and die, their seeds alone persisting through the ensuing drought. Here, as everywhere, Nature is never tired of exhibiting her versatility and fertility of resource. Every variety of device for obtaining and conserving water may be observed. Some plants, especially the shrubs, have deep root-systems which can obtain supplies of subterranean water. Others have their roots scarcely buried in the earth, and so can make use of light showers and even of the dew. Many have tiny, reduced leaves, of varied structure, but always such as to lessen the output of water. Others again store up large supplies of water in fleshy, succulent stems or leaves, or even in underground tubers or bulbs. Finally, we have the delicate desert ephemerals, whose active life does not extend beyond the brief rainy season. Thus the native plants of this region form silent, but none the less eloquent, witnesses to the severity of the climate. That drought and not a want of fertility of the soil is responsible for the prevailing paucity of vegetation, is evidenced by the fact that where irrigation is possible, rich crops may be cultivated.

The succulent plants are worth further consideration. Many of these are well-known in European cactus houses, where they are popularly but erroneously known as 'cacti'. The mistake is not unnatural, as some of the South African succulents (e.g. stapelias and euphorbias) bear extremely close resemblance in form to the quite

unrelated true cacti. The latter (family Cactaceae) are almost confined to the climatically similar regions of Mexico and other parts of the New World.¹ This again illustrates the principle that similar life-forms are called forth by similar climatic conditions, even though these occur in centres geographically remote from each other. Among the succulents, too, occur a number of highly interesting plants, which closely resemble in form and colour the stones and rocks among which they grow. Dr. Marloth suggests that these plants may derive in this way some protection from herbivorous animals. One of the most striking is *Mesembrianthemum calcareum*. The leaves of this plant are set with projecting knobs, and both the plant and the limestone on which it grows are of a whitish colour sprinkled with dark brown. So complete is the deception, says Dr. Marloth, that no artist could imitate the stones more perfectly. The colonists call these remarkable plants 'flowering stones'.

In some parts of the country succulent plants predominate, and it is possible to speak of a 'succulent-steppe'. In others we find a 'dwarf shrub-steppe', with but few succulents. But in most parts of the area the various plant-forms grow intermingled in varying proportions; always, however, with intervals of unoccupied bare ground.

As regards the dominant plant families of the central province, the Compositae come first, and this is especially true of the Upper Karroo. Leguminosae, Ficoideae (genus *Mesembrianthemum*), Liliaceae, Crassulaceae, &c., are all abundant, and contain many highly peculiar forms. Grasses (Gramineae) are frequent, but nowhere form the dominant feature of the vegetation, as they do on the grass-steppes.

The grass-
and tree-
steppe
region.

By far the largest of the phyto-geographical provinces is the grass- and tree-steppe region, which occupies part of the east of Cape Colony, most of Natal, the Orange Free

¹ The prickly pear (*Opuntia*), which is widely spread over the drier parts of Africa, belongs to this family, but has been introduced into the Old World by man.

State, the Transvaal, Bechuanaland, and a large part of Rhodesia. The eastern part of the province (including the Orange Free State and most of the Transvaal) forms a great elevated plateau, 4,000 feet or more above sea-level. This plateau has an average rainfall of between 20 and 30 inches. Towards the west (the Kalahari) the elevation is considerably less, and the climate is drier. At Upington, for example, the annual rainfall is only 8.7 inches. Most of the province lies within the area of summer rains, the winter being a season of drought. As regards temperature, part of the region is actually within the tropics. In the eastern parts, however, the effect of an approach towards the tropics is largely neutralized by increasing altitude. Thus over much of the Transvaal the warm summers permit of the cultivation of tropical annuals, such as tobacco, &c., but tropical perennials, e.g. bananas, pine-apples, &c., are injured or even killed by the low winter temperatures.

In general it may be said that the vegetation of the grass- and tree-steppe region differs from that of the central province less in any radical change in the plant-forms present, than in the relative abundance of the various types. Thus trees, shrubs, grasses, succulents, bulbous and tuberous plants occur in both provinces, but the numerical importance of these respective forms varies greatly. In the central province dwarf shrubs and succulents are the dominant plant-forms. Grasses are present but play a subordinate rôle, while trees are practically absent except along the water-courses of the Karroo. On the other hand, grasses and trees are the dominant plant-forms in the region now under consideration. Many succulents occur, however, especially on the stony kopjes. Bulbs and tubers are abundant in both. The long winter droughts impose on the plants a necessity for a generally xerophytic character, and even on the grassy steppes there are often patches of bare soil between the individual plants. The trees mostly shed their leaves during the dry winter season, thus contrasting with the ever-green 'macchia' of the Cape Province. The great

grass- and tree-steppe province may be subdivided as follows :

(a) *The Kaffrarian district*, to the east of the Karroo, including Eastern Cape Colony and the middle terraces of Natal. Considerable areas are occupied by a grass- and bush-steppe, while in many parts arborescent aloes and other succulents are common, especially on the rocky kopjes. *Anthistiria imberbis* is one of the commonest grasses, and acacias, especially *A. horrida*, the dominant trees.

(b) *The High Veld* of the Southern Transvaal, the Orange Free State, and the upper terraces of Natal. In this district, trees (*Rhus viminalis*, acacias, &c.) fringe the water-courses, shrubs occur on the kopjes, but the greater part of the country is covered by a treeless steppe. Grasses (*Anthistiria*, &c.) are here the dominant plants, though many other small herbs occur between them.

(c) *The Kalahari* in the west, comprising Bushmanland and a great part of Bechuanaland.¹ This area is much drier than the eastern portions of the province : it is, however, not a true desert, though often loosely referred to as such. For the most part it consists of a tree- or bush-steppe, with numerous grasses ; succulents (e. g. *Aloe dichotoma* and *Euphorbia Dinteri*) abounding wherever there is rocky soil. The Kalahari is closely allied to the Bush and High Veld, differing from them chiefly in the scantier vegetation, and the absence of species dependent on a more ample water-supply.

(d) *The Bush Veld*, which occupies much of the Northern Transvaal, Southern Rhodesia, and parts of Bechuanaland. For the most part the country presents a park-like appearance, being covered by a grassy vegetation, rising above which are trees with spreading crowns. Sometimes the trees are few and scattered, at others they are more abundant, and forest of an open character results. Such is the so-called ' teak forest ' of Rhodesia. This vegetation is closely allied, both as regards its general character and

¹ Some phyto-geographers have used the term Kalahari in a wider sense than that employed here.

also the actual plants which occur, to the steppe regions of Central Africa. Some Central African trees (e.g. *Dombeya densiflora*) occur even as far south as Johannesburg. An interesting local development of luxuriant evergreen rain forest is found immediately around the Victoria Falls of the Zambezi, under the influence of the ever-present mist and spray.

The natural vegetation described above has been much modified by human agencies. Directly by axe, fire, and plough, and indirectly by the introduction of herds of grazing animals, man has altered the extent, and in some cases even the character of the native vegetation. The macchia of the Cape Province and the forests of the Knysna district are undoubtedly less extensive than formerly. Veld-burning, universally practised, probably from time immemorial, by the natives all over South Africa, must profoundly affect the vegetation. Trees and other exposed plants suffer severely from these veld fires. Others, e.g. bulbs and tubers, are not adversely affected at all, as the fires usually occur during the dry season, when such plants are resting beneath the surface of the earth. There is little doubt that by discouraging other plant-forms, the frequent veld fires are at least partly responsible for the enormous number of individuals of this type of plant in South Africa. But in spite of human interference, the greater part of British South Africa is still covered by vegetation which is largely natural.

The
influence
of man.

[In addition to Marloth's work above quoted, see G. Henslow, *South African Flowering Plants*, London, 1903; Sir W. T. Thistleton-Dyer, *Flora Capensis*, London, 1896-1900; D. E. Hutchins, *Transvaal Forest Report*, Pretoria, 1904; B. Stoneman, *Plants and their Ways in South Africa*, Cape Town, 1906; T. R. Sim, *Forests and Forest Flora of the Cape of Good Hope*, Aberdeen, 1907; J. M. Wood, *Handbook to the Flora of Natal*, Durban, 1907; J. W. Bews, *The Vegetation of Natal*, Pietermaritzburg, 1912.]

CHAPTER IV

FAUNA

BY W. L. SCLATER

Zoo-geo-
graphical
relations.

SOUTH AFRICA forms a portion of the Ethiopian region, one of the six primary regions into which the land areas of the world have been divided for the study of the distribution and the interrelations of the higher forms of animal life. The Ethiopian region includes within its limits the whole of Africa south of the Tropic of Capricorn, the corresponding portion of Arabia, and Madagascar with its dependent island groups. There has been some difference of opinion in regard to the division of the Ethiopian region into sub-regions, but there can be no doubt that Madagascar and its islands, and the West African forest region, form two distinct faunal areas, while there is a good deal of uniformity in the fauna of the rest of the country from the Cape to Somaliland and thence to Senegambia. We may, therefore, for the present purpose consider South Africa to form a portion of the great East African sub-region of the Ethiopian region.

As regards the past history of the Ethiopian region as a whole, the recent discovery, in deposits of Eocene age in the Fayum of Upper Egypt, of the remains of a number of extinct forms of mammalian life, has introduced into the problem of the origin of the African fauna a new set of data. Up to that time what may be called the Huxleyan theory of radiation had held sway. According to this theory, the Ethiopian region had been colonized by two great immigrations ; an earlier one in Eocene or early Miocene times, while Madagascar still formed part of the continent, brought in the lemurs and other primitive forms which make up the present fauna of that island, of which age only a few scattered remnants have survived in Africa proper ; while a later immigration, which took place in Pliocene times, introduced the antelopes, hippo-

potamus, rhinoceros, zebras, ostriches, apes, and higher carnivora, which now form so conspicuous a feature of the fauna of Africa, and have still living or recently living representatives in Southern Asia.

Most of the ancestors of these forms have been traced back to the earlier Tertiary deposits of the northern hemisphere, but hitherto no ancestral forms of the Proboscidea (elephant group) have been met with of earlier date than the mastodons of the Miocene and Pliocene times, and these have been found in America as well as in the Old World. Recent exploration in the Fayum district in Egypt, by Mr. Andrews of the British Museum, has resulted in the discovery of a number of interesting Eocene types which throw a fresh light on the earlier evolutionary stages of several mammalian orders. Perhaps the most remarkable form is one named by him *Moeritherium*, a very generalized type of Proboscidian, with a full series of front teeth and an almost complete set of molars all in use at the same time, thus differing widely from the modern living forms. Nevertheless, the modern type is foreshadowed not only in the shape and structure of the teeth, but also in the enlargement of the second pair of incisors in each jaw ; an enlargement which continues to be more and more marked in geologically succeeding types until it culminates in the tusks of the modern elephant. From these facts and many others it appears probable that although some components of the Ethiopian fauna may have been evolved in the northern continents and have reached Africa by migration, other groups, such as the Proboscidea, have more probably originated in Africa itself.

The first settlement of the Cape dates from 1652, when van Riebeck landed and took possession of the country in the name of the Dutch East India Company. His journal, which has recently been republished in English, contains many references to the larger animals which then abounded in the immediate neighbourhood of the little fort which subsequently became known as Cape Town. Hippopotami wallowed in the swamps, and herds of eland, harte-

History of
zoological
discovery
in South
Africa.

beest, and kudu ranged over the wooded slopes of Table Mountain. Lions were numerous and gave much trouble to the early settlers, while there is a well-known story that when the governor, the elder Van der Stel, was making a journey of exploration northwards in 1685, his coach was upset by a charging rhinoceros, and he himself had a narrow escape.

Zoological exploration, however, did not really begin till the end of the eighteenth century, when two Swedish travellers, Sparrman and Thunberg, pupils of the great Linnaeus, went to South Africa for the special purpose of collecting specimens of the fauna and flora. Their travels, as well as those of the eccentric Frenchman Le Vaillant, who devoted himself chiefly to birds, are among the classics of early zoological exploration. In 1795, with the advent of the English, a fresh stimulus was given to investigation, both geographical and zoological, and with this period the names of John Barrow and Burchell must always be associated. The latter, who landed at Cape Town in 1810, penetrated into the interior as far north as Kuruman in Bechuanaland, and made very extensive collections of animals as well as plants. The accounts of his journeys and explorations appeared in 1822-4 in two large quarto volumes, and are a monument of his exact and methodical observations. In the second and third decades of the nineteenth century our knowledge of the South African fauna was much advanced by the researches of Sir Arthur Smith, who occupied a position in the Army Medical Service. His travels extended as far north as Kurrichane, the capital of the Zulu chieftain Mozelekatze, near the head-waters of the Limpopo, and eastward to Durban, which was founded about that time. His collections were described and illustrated in four large quarto volumes, published in 1849, dealing with mammals, birds, reptiles, and fishes respectively. A new incentive was given to the study of South African zoology by the founding of the South African Museum in 1855, and the appointment of Mr. E. L. Layard as curator. He devoted himself chiefly to the study of ornithology, and in 1867

published the first complete work on South African birds. His successor, Mr. Roland Trimen, chiefly occupied himself with the Lepidoptera and made many interesting researches in regard to the questions of mimicry, dimorphism, and seasonal variation, and their relation to questions of evolution and natural selection. Of recent years, perhaps, the most fruitful of investigations has been that which was undertaken for the benefit of the British Museum at the expense of Mr. C. D. Rudd and under the direction of Mr. Oldfield Thomas. The work of collecting was entrusted to Mr. Claude Grant, who spent nearly five years (1903-7) at various selected localities in South Africa, ranging from Namaqualand to the Zambezi. The collections resulting have been described in the *Proceedings of the Zoological Society* and in the *Ibis*.

Africa is without question the chief home of the larger Mammalia forms of animal life. No other continent possesses such an assemblage of the larger herbivores as is formed by the elephant, rhinoceros, giraffe, buffalo, hippopotamus, and the various genera of the larger antelopes. On the other hand, the deer family (Cervidae), with their deciduous antlers, are conspicuously absent from the Ethiopian region. It is difficult to find a satisfactory explanation of this, but the deer certainly appear to have originated at a somewhat later period than the antelopes, and were perhaps hardly sufficiently highly-organized to take part in the great Pliocene immigration which peopled the Ethiopian region with most of its larger and more conspicuous types.

In South Africa to-day, although the numbers of individuals are undoubtedly much reduced since the settlement of the interior during the last hundred years, there are still to be found representatives of all the larger characteristic Ethiopian animals. We can easily realize how the plains of the interior of South Africa appeared to the eyes of Gordon Cumming and Cornwallis Harris in the 'forties and 'fifties by comparing their narratives with the appearance of the Athi plains of British East Africa at the present day. Even in Cape Province, however,

there are still two herds of wild elephants, one in the Knysna forest, the other in the Addo bush near Port Elizabeth, while there are also a fair number to be found in the wilder parts of Rhodesia. Both the species of rhinoceros found in South Africa belong to the Atelodine group of the genus, distinguished by their single horns, comparatively smooth skins, and by the absence of canine and incisor teeth in the adults. The larger species, generally called the white, but better the square-lipped rhinoceros, is, after the elephant, the bulkiest of land animals now living. It was formerly abundant all over the grass country to the north of the Orange River ; now it is on the verge of extinction, and only a few examples are known to survive in Zululand. It was formerly thought to be confined to Africa south of the Zambezi, but has been recently met with in the upper White Nile districts near Lado. The common or black rhinoceros is a smaller species, and can at once be distinguished by its prehensile upper lip, which is produced into a short proboscis. It is still fairly common in the more remote parts of South Africa.

The African antelopes number about 150 species, and of these about 35 have been found in South Africa : an unrivalled assemblage, ranging from the lordly eland to the tiny bluebuck. The spread of settlement and increase of population, and perhaps even more the keen hunting instinct of the South African Dutchman, have sadly diminished the numbers of these beautiful creatures, but notwithstanding this, only one species has entirely died out. This is the blaawbok of Swellendam, which was closely allied to the roan antelope of Rhodesia and East Africa. It appears to have always had a limited range in the south-west corner of Cape Province, and to have become extinct at the beginning of the nineteenth century. On the other hand, several species, such as the bontebok and the wildebeest or white-tailed gnu, have only survived through the efforts of individual enthusiasts who have fenced in large reserves on farms for their preservation. Of late years several government reserves have

been formed where no shooting is allowed, or at all events the killing of larger animals is carefully controlled. The largest of these, in the eastern part of the Transvaal, is known as the Sabi reserve, extends from the Crocodile River to the borders of Rhodesia, and has been in existence since 1892.

It is impossible here to mention the various species of antelopes. Perhaps one of the most characteristic is the springbok (*Antidorcas euchore*). The genus contains only the single species and is confined to South Africa. It is distinguished by a curious fan of long hairs down the middle of the back which the animal can raise or depress. It lives in vast herds, which are subject to periodical migrations or treks, the causes of which are obscure, though probably due to climatic conditions.

The buffalo, the giraffe, and the hippopotamus are still to be met with in the more remote parts of South Africa ; the last named is far from uncommon on the Zambezi near the Victoria Falls, and has been the cause of many accidents to the canoes and boats of tourists visiting the Falls.

The South African carnivora are numerous both in individuals and species, and out of eleven families usually recognized there are representatives of seven. Curiously enough the bears (Ursidae) are entirely absent from the African fauna. The lion was formerly abundant over the whole of South Africa, and in the earlier days of the settlement at the Cape was a constant source of annoyance and danger. It is now found only in the remoter districts of Rhodesia and the Transvaal. The leopard, called *tijger* by the Boers, is far more plentiful. It inhabits the rocky hills and kopjes, and only comes out at night to prey on the sheep of the farmer, and to this it owes its survival even in the neighbourhood of Cape Town. Among the smaller carnivora are the wild cats, cheetah, civet, genet, meerkat, hyena, ratel, and many others.

The group of monkeys is not very numerously represented in South Africa ; this is easily accounted for by the scarcity of forest country. The best-known form is

undoubtedly the baboon or bavian (*Papio porcarius*), often called in Europe the chacma, a name unknown in South Africa, though said to have been derived from its original Hottentot appellation. Baboons are found in open country and especially among the rocky hills which form so prominent a feature of South African scenery; here they live in troops, issuing forth at earliest dawn to rob the farmer's orchards and gardens, for which they are universally execrated. The other monkeys belong to the genus *Cercopithecus* and are confined to wooded districts of the south and east coasts. The lemurs, whose head-quarters are in Madagascar, are represented by several species of galago found in the more wooded districts of Natal, the Transvaal, and Rhodesia. The Rodentia are represented by numerous species of rats and mice, a few squirrels, the rodent moles, a porcupine, and several species of hares; the Insectivora by the golden moles, whose fur has a beautiful metallic sheen, and the elephant shrews, which sit up on their hind quarters like a kangaroo and have a long tapering snout from which they derive their name. Finally, among the Edentata the aardvark (*Orycteropus*), with its congener from North-East Africa, constitutes a family so distinct from the others of the order as in the opinion of many to require separate ordinal accommodation. The most remarkable feature of these creatures is in the structure of their molar teeth—they have no others—these are made up of a number of columns of dentine, each with its separate pulp cavity packed together to form a solid tooth. No other mammal has teeth in any way comparable to the aardvark, nor have we as yet any clue to its ancestral history.

Birds.

With the possible exception of the butterflies, the birds form the most closely studied and best known components of the South African fauna. A recently published checklist by Messrs. Gunning and Haagner enumerates 920 species as occurring in Africa south of the Zambezi. While it is improbable that many actual new forms of bird life remain to be discovered in South Africa, our knowledge of the life history and distribution of many

of the species is imperfect, and there remains for the field ornithologist plenty of scope for the observation of the migratory phenomena, food habits, and nesting habits of the South African birds.

As regards migration we have in South Africa two very distinct groups of migratory birds. On one hand there are the birds which breed in Europe in the summer of the northern hemisphere, and come as far south as South Africa during the northern winter. Most conspicuous among these is the common barn swallow, the lesser grey shrike, the white stork, and the cuckoo. These reach South Africa about October and stay till March, and with one or two exceptions are not known to nest in South Africa, although this is the breeding season of most of the South African birds. There is another group of migratory birds such as the stripe-breasted swallow and some of the cuckoos (*Cuculus gularis* and *C. solitarius*) which arrive apparently from the north about the same time as the European migrants and breed. During the winter season—April to September—they are absent and presumably wintering in Central Africa. There are also many birds which are resident throughout the year, or are only subject to local movements of which we are at present woefully ignorant.

Among the birds peculiar to South Africa are the long-tailed sugar birds (*Promerops*). They appear to have been specially modified for existence and to be conterminous in their distribution with the plants of the natural order Proteaceae, which form so characteristic a feature of South African plant life. Other groups, such as the bush shrikes, the plantain-caters (*Muscophagidae*), and the colies (*Coliidae*), are equally characteristic though found elsewhere in the Ethiopian region.

South Africa possesses many birds remarkable in their sexual and breeding relations. The great-tail widow bird (*Coliuspasser procne*), commonly called the Sekabuli by the Kaffirs and the colonists, is one of these. It is one of the only polygamous passerine birds. It lives on the open grassy plains, and in spring each male, accompanied by

ten or twelve females, selects a suitable spot for nesting in the long grass. Here each hen builds a separate nest, while the cock watches the proceedings from some vantage spot ready to warn the hens of approaching danger and to drive off intruders. The breeding habits of the hornbills are even more remarkable. In this case the male plasters up the breeding hole into which he has introduced his mate, so that only a very small aperture is left through which the bill of the female is protruded. Here she remains a prisoner for some six weeks until the eggs are hatched and the young are feathered, while the male brings food for her and the young birds. Still more interesting are the honey-guides (Indicatoridae). Of dull plumage and appearance, they are remarkable for the fact that they will lead the traveller to the situation of a wild bees' nest in the hope of sharing with him some of the spoil in the shape of wax or honey. In addition to this they are undoubtedly, like cuckoos, parasitic in their breeding habits, and deposit their eggs in the nests of other birds.

Finally South Africa contains a representative of the Ratitae or wingless birds, all of which are now confined to the southern hemisphere. This is the southern ostrich (*Struthio australis*), restricted to Africa south of the Zambezi. It has become a domesticated bird throughout the greater part of Cape Province and is bred and kept for the sake of its plumes, which are annually pulled or cut.

Reptiles
and
batrachians.

In a list of South African reptiles and batrachians drawn up by the present writer some time ago, about 290 species were included; to these a certain number of additional species must now be added.

Of the crocodiles only one species has been met with; this is the same species as is found in the Nile and in other parts of tropical Africa. It is confined to the rivers flowing into the Indian Ocean from the Zambezi to Pondo-land, and is unknown in the western streams. It probably seldom exceeds a length of more than 15 feet.

Land tortoises and lizards are numerous, but present no specially interesting features. The snakes number

nearly a hundred species, of which about twenty-two are reported to be poisonous. Notwithstanding this, instances of fatalities resulting from snake bites are exceedingly rare, and very few cases came to the knowledge of the writer during twelve years' residence in South Africa. Among the commoner species is *Naja flava*, the yellow cobra, widely distributed through South Africa, and common enough in the neighbourhood of Cape Town. Like the more familiar Indian species, the neck can be flattened out and widened to form the hood, but it can be at once distinguished by the absence of the so-called spectacle marks. The justly dreaded mamba (*Dendraspis*) is only found in Natal and the low country of the east. It is more of a tree snake than the others, and sometimes reaches a length of ten feet. The younger specimens are green, and as they grow older they get darker, but there are no grounds for distinguishing the black and green mambas specifically. Among the viperine snakes the commonest and most dangerous is the puff-adder (*Bitis arietans*), an ugly reptile of yellowish and orange brown. Though seldom reaching a length of more than four feet, it is of great girth. Its habits are inert and sluggish, and it is justly held in great fear on account of its generally fatal bite.

South Africa is not rich in batrachians. Of the three orders only the tailless frog-like Anura are represented. They number some thirty-six species, and are distributed among four families. The largest of the South African frogs is *Rana adspersa*, which often attains a length of eight inches. It is common in the eastern half of the Cape Province and in the Transvaal, and has a very loud croak. An interesting form is *Xenopus laevis*, a very distinct type, with no tongue and with claws to some of the hind toes. It is far more aquatic in its habits than any other frog, and seldom leaves the water.

A few lines must be devoted to the interesting remains of extinct reptiles which have been found in South Africa in various strata of Karroo formation. These probably correspond to the beds of Permian and Triassic age in

Extinct
reptiles.

Europe. The remains of these extinct types are comparatively abundant and well preserved, and are of special interest as it was in these times that the great radiation took place which gave rise to the various orders of reptiles as well as to the more primitive forms of mammals and birds, and it is among these fossils that the clues of the ancestral history of all the higher types of vertebrate life will probably be found. The lowest of the Beaufort beds contains the remains of a number of heavily built land reptiles of which the most prominent and best known form is *Pareisaurus*. This large reptile measured about nine feet in length and stood about three and a half feet in height. The head is broad and flat above, and the temporal region completely roofed over. There are fourteen to sixteen fairly equal flattened teeth with notched edges in each jaw. The limb bones and vertebrae are very massive, and are specially interesting as they resemble the bones of mammals more than of reptiles. *Pareisaurus* was probably a slow-moving animal that lived in the marshes of the great island sea of the time. A nearly complete mounted skeleton is to be seen in the Natural History Museum in London and another in the Museum at Cape Town. *Dicynodon* is another interesting genus of mammal-like reptiles, so called from the large upper canine teeth which form tusks while the rest of the margin of the jaws is covered with horn as with tortoises. Apart from the jaws and teeth, the bones of the skeleton have a striking resemblance to those of mammals. The *Dicynodons* were probably sluggish animals which lived in the marshes and fed like tortoises. A somewhat later form from the uppermost of the Beaufort beds is *Cynognathus*, a large carnivorous creature about the size of a hyena. The skull and most of the bones of the skeleton are almost typically mammalian. The teeth are divided into incisors, canines, premolars, and molars. There is a well-developed secondary palate, and the lower jaw is formed almost entirely by the dentary. The quadrate bone is rudimentary, and though the hinge of the lower jaw is still (as in reptiles) between the quadrate and the

articular, the dentary almost reaches the articulation. The skull is also (as in mammals) supported by condyles.

Our knowledge of these interesting reptiles is derived from the researches of Sir Richard Owen and H. C. Seeley, and at the present time more especially to the work of Dr. R. Broom of Johannesburg, who has published numerous papers in various South African and other journals on the subject.

The paucity of fresh-water fishes in temperate South Africa is remarkable ; it is doubtless caused to a certain extent by the scarcity of permanent rivers and lakes. Many of the rivers, especially in the western and drier half of South Africa, only contain water during the rainy season, or even in some cases for a few hours after a rain-storm, so that most of the fishes have to be able to adapt themselves to these conditions in order to survive.

The family most largely represented in the fresh waters of South Africa is the carp family (Cyprinidae), and most of the species are related to the widely-distributed genus *Barbus* ; all of them are somewhat sluggish forms, and have barbules dependent from the jaws ; Boulenger in his catalogue enumerated thirty-six species from the various rivers of South Africa south of the Zambezi. The only other family of numerical importance is the Siluridae, containing the cat-fishes. One species, first discovered by Burchell and named *Clarias garieppensis*, attains a considerable size. It is known as the ' plattekop ', and is not uncommon in the deep pools of the Orange and Vaal Rivers, where it lies on the mud. It is of rather forbidding aspect with a scaleless shining body, and a broad flat head bearing eight long barbules. An interesting fish is *Spirobranchus capensis*, not very distantly allied to the perch of English waters. It has a complicated accessory breathing organ, in the cavity of which it retains a little water enabling it to live for some time in the open air or enclosed in dry mud. Finally, mention may be made of a little fish of the genus *Galaxias*, which was first made known from South Africa by Steindachner of Vienna, when describing Holub's collection. It is an

insignificant little fish, seldom exceeding four or five inches in length, and appears to be confined to the south-western districts of Cape Colony. It belongs to a distinct family with rather distant relations to that of the salmon. Its more particular interest is that the members of the genus and family are confined to the fresh waters of the southern hemisphere, the species being distributed in Chile, New Zealand, Tasmania, Australia, and South Africa; and on this account it has been used as an argument for the former connexions of the lands of the southern hemisphere with one another at some remote geological epoch. That some such connexion did once exist seems probable, but most of the arguments seem to point to its having been pre-Tertiary at any rate, and there are but few arguments in favour of any land bridge between the Cape and Patagonia on the one hand, or the Cape and Australia or New Zealand on the other, having been in existence since the appearance and dispersal of the higher terrestrial forms of vertebrate life.

Insects
and other
inverte-
brates.

In the warmer parts of South Africa one of the most remarkable features of the landscape is the large smooth mounds of earth made by the termites or white ants. All the species are not mound-builders, but many of them form an important factor in the economy of many other insects which feed on them. Termites, especially the winged forms which swarm out of the mounds in countless numbers during the early rains, form the greater part of the food of countless insectivorous birds and even mammals, while many other animals find a secure home within the nests themselves.

Butterflies (*Rhopalocera*), though not numerous in species—about 370 are described—are well known chiefly through the investigations of Mr. R. Trimen, but they have formed the basis of some interesting investigations in regard to mimicry and polymorphic forms by Mr. G. A. K. Marshall and others.

The Diptera are little known, but among them is the dreaded tsetse (*Glossinia morsitans*), which is the carrier of the blood parasite trypanosome from the wild to

domestic animals, and causes the fatal *nagana* disease, making it impossible to use horses and cattle in the 'fly country'. Recently it has been shown that the same species of *Glossinia* is able to convey the trypanosome of sleeping-sickness equally as well as the other species (*G. palpalis*), but hitherto sleeping sickness is unknown south of the Zambezi.

Mr. Peringuey estimates that the number of species of insects found in South Africa cannot be less than 40,000, and that of these the Coleoptera alone have more than 15,000 representatives. Finally, South Africa is the home of a little animal of extraordinary interest to all zoologists, named *Peripatus*. It is a small caterpillar-like creature which lives under stones and rotten wood along mountain streams, and perishes very quickly when exposed to the dry air. Its special interest lies in the fact that it has structural characters allying it on one hand to the air-breathing Arthropods such as the insects, and on the other hand to the Annelids or worms.

The following is a list of recent general publications on South African zoology: Bibliography.

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2. BIRDS. *The Birds of South Africa*, by A. C. Stark and W. L. Sclater; four vols., London, 1900-6. 'Check List of the Birds of South Africa,' by W. L. Sclater in the *Annals of the South African Museum*, vol. iii, pp. 303-87 (1905). 'A Check List of the Birds of South Africa,' by Dr. J. W. B. Gunning and A. Haagner, in the *Annals of the Transvaal Museum*, vol. ii (1910).

3. REPTILES AND BATRACHIANS. 'List of Reptiles and Batrachians of South Africa,' by W. L. Sclater, in the *Annals of the South African Museum*, vol. i, pp. 95-111 (1898). 'A Revised List of the South African Reptiles and Batrachians, with Synoptic Tables,' by G. A. Boulenger, in the *Annals of the South African Museum*, vol. v, part 9 (1910).

4. FRESH-WATER FISHES. *Catalogue of the Fresh-Water Fishes of Africa* in the British Museum, by G. A. Boulenger; two vols. (incomplete), 1909-11.

5. INSECTS, &c. *South African Butterflies*, by R. Trimen and J. H. Bowker; three vols., London, 1887-9. 'Descriptive Catalogue of the Coleoptera of South Africa,' and many other papers on South African entomology, published in the *Transactions of the South African Philosophical Society*, and in the *Annals of the South African Museum*. Papers on 'South African Spiders and Scorpions', and on 'Peripatus', by H. Purcell, are also in the same journals.

CHAPTER V

AGRICULTURE

By A. D. HALL

Climate
and agri-
culture.

THE agriculture of South Africa is very largely determined by the distribution and extent of the rainfall; the two distinct climatic conditions which prevail—of summer and winter rains—result in vital differences in the crops that can be grown. As the climate and topography of the region have been dealt with elsewhere, it will be sufficient here to indicate the districts which can be said to have special agricultural characters and the climatic factors to which they are due.

Coast
plateau of
Cape Pro-
vince.

The earliest settled and best known of these districts is that of the coast plateau in the neighbourhood of Cape Town from about Olifant's River on the west coast as far east as Port Elizabeth, the northern boundary being the Zwartbergen Range beyond which begin the plateaus of the Karroos. This region is distinguished from the rest of South Africa by receiving the greater part of its rainfall in winter; the precipitation varies considerably, from Cape Town northwards up the west coast it becomes progressively less until in Namaqualand desert conditions prevail. In the Cape Peninsula itself the rainfall rises to about 40 inches, and this zone extends inland with local variations in the rich valleys by Stellenbosch, the Paarl, Worcester, and Swellendam. Eastwards a drier region succeeds, but from Mossel Bay the higher rainfall again sets in and gives rise to the forest region of the Knysna. Port Elizabeth may be taken as the limit of the winter rains, beyond it the prevailing rainfall occurs in the summer.

Cereals.

It is in this district that agriculture proper of a comparatively advanced order chiefly prevails. The winter rainfall permits of the growth of all the European cereals, wheat, barley, oats, and maize. Where the winter is too

dry to permit of these cereals growing until the spring and the rains, though they then grow with great rapidity owing to the moisture and rising temperatures, they become liable to rust and fail to yield a paying amount of grain. By irrigation alone in regions of summer rain can the plant be established before the winter and carried through the period of drought ; it is then so far advanced as to be little liable to serious damage from rust. The chief wheat-growing areas are Clanwilliam, Malmesbury, and Tulbagh, but a certain amount is also cultivated in the eastern districts.

The most characteristic feature, however, of the agriculture of the coast plateau is the cultivation of the vine and fruit. The vine was introduced by the earliest Dutch settlers in 1653, the government wine farm at Constantia being founded as early as 1680. The best districts are the Cape Peninsula itself, Worcester, Montagu, Lady-smith, and Oudtshoorn. The most valued soil in the Wynberg country is a deep loam derived from granitic rocks, in the other districts a vein of red marl known as the kalksbank. The routine of cultivation followed corresponds closely with that adopted in Europe, and the yield is large, up to 600 gallons per 1,000 vines. At one time Cape wine was extensively exported and possessed some reputation in Europe, but the English market for cheap wines is now mainly supplied from Australia, California, &c., and, since the phylloxera attacked the vines, very little Cape wine is sold as such in this country. The vines have been re-established on phylloxera-proof stocks, but sufficient care has not been taken in the growth and storage of the wine, the quality of which was further reduced by blending and fortification of inferior wines with brandy. Of late years much more attention has been paid to the manufacture of wine, and many are now produced, both Hermitage (claret type) and Drakenstein (hock type), that are fit to export. The price obtained, however, is still very low, and the chief market is in South Africa itself. From the inferior wines a good deal of brandy is distilled. The vine-producing

districts with their winter rainfall are also eminently suited to the growth of European fruits, apples, pears, plums, and peaches, and of late years a considerable export trade has been built up, the fruit being sent over in cold store and sold in England in the early spring months, at a time when little other soft fruit is available. The peach was already widely distributed, having been taken all over South Africa by the Dutch settlers, but this so-called Cape peach is small and of little value for export. Peaches and plums of European origin have generally proved too soft for transit, but the greatest success as far as the export trade goes has been obtained with varieties from California, though the plums have probably their origin in Japan. The peaches are extremely handsome fruit, but most characteristic are the very large and solid plums—Kelsey and Wickson—which are unlike any others reaching the English market. Though the growth of these soft fruits is confined to the districts about Stellenbosch and Worcester and the Hex River valley, nearly the whole of South Africa grows very good oranges, in which an export trade has begun. The old Dutch farm, even far to the north of the Transvaal, always possessed its orange grove and peach orchard. The South African orange or naartje belongs to the mandarin type with an easily detached skin, but climate and soil are suitable to the growth of all types, and many plantations of the larger varieties have recently been established. In Natal and the warmer portions of the Transvaal all varieties of citrus, as for example the grape fruit, grow with great freedom. While dealing with the export trade in fruit we may mention that the warm coast lands of Natal also produce pineapples, small, though of excellent flavour.

Tobacco. An increasing amount of tobacco is grown in the valleys near Oudtshoorn and Swellendam; this is not, however, the typical characteristic Boer tobacco grown in the hill country near Pretoria, nor does it resemble the fine cigarette tobacco grown from Turkish seed in Rhodesia.

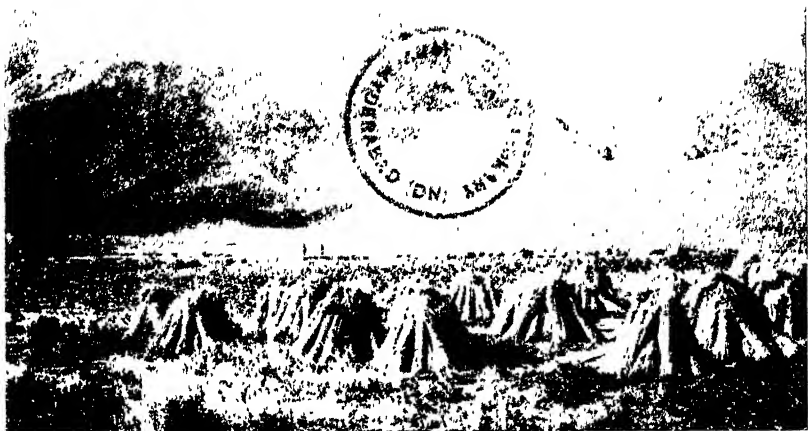


PLATE V (a). KEERONSBERG, HEX RIVER VALLEY

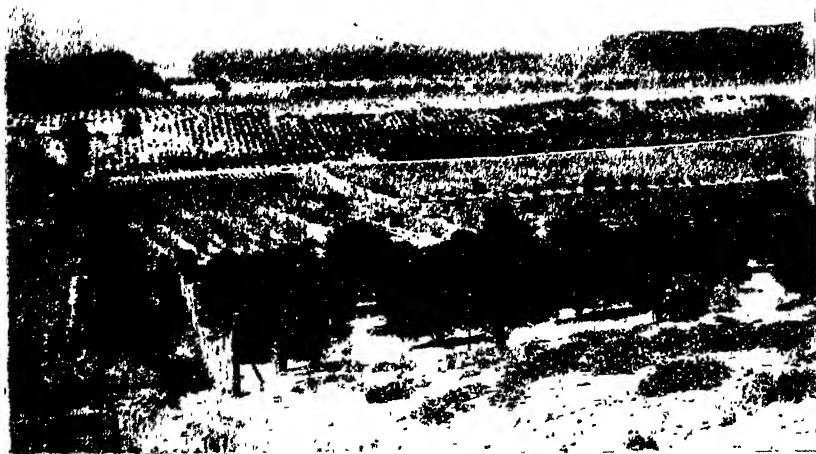


PLATE V (b). FRUIT FARM, CONSTANTIA DISTRICT
(High Commissioner for South Africa)



PLATE VI. BIGGARSBERG, HIGH VELD
(High Commissioner for South Africa)

Immediately north of the coast plateau in the Cape Province come the Karroos, dry plateaus, the southern being about 2,500 and the Great Karroo about 4,000 feet above sea-level, which differ entirely in character from the veld, the more elevated plateau which occupies the interior of South Africa as far as the Zambezi. The rainfall is very low, 10 to 15 inches, and the whole area burns up to a desert in the early summer. The vegetation, however, consists in the main of various flowering plants and small bushes, among which species of mimosa and other leguminous plants predominate, and this vegetation, even when in a dry and twig-like condition, affords excellent grazing for stock, provided they can obtain access to a supply of drinking water. Except where one of the rivers can be used for irrigation, under which the Karroo soil proves remarkably fertile, the only agriculture practicable with the limited amount of water which a farmer can store in a dam is sheep and goat farming, and large flocks are still maintained in this district, a merino cross being the usual type of sheep. From 3 to 10 acres per sheep are required unless the farm possesses some irrigated land to serve as a standby in the time of drought. The Karroo is also the true home of the ostrich; though ostrich-farming has extended into many other districts they are still most numerous about Oudtshoorn. Ostriches are allowed to graze in large wired-in camps, each bird requiring about 20 acres, though cattle at the rate of two to every three ostriches may with advantage also occupy the land. An ostrich yields from 1 to 2 lb. of feathers every year, of which the price averages about £2 per lb., not a large return, but the birds require no artificial food except when the drought is prolonged, and little attention except at the breeding time. Attempts have been made to introduce ostrich-farming into other countries, as Australia and California, but with little success; the karroo bush is a much more suitable food than grass and the best feathers are produced where the ostriches roam over a wide area. Recently ostrich-farming has proved

remarkably profitable ; the price of feathers has advanced, and the introduction of lucerne as a fodder crop for the birds has greatly extended the capacity of the land to carry ostriches.

Eastern
districts
of Cape
Province.

The eastern districts of the Cape Province share in the winter rainfall of the Cape Town area as far east at least as Port Elizabeth. The climate is dry, however, and though maize, fruit, and in some districts tobacco are grown with success, the agriculture of this region mainly depends upon the production of wool and mohair. The export of wool, however, from the Cape no longer possesses its former importance in the London market. This has been entirely due to the inroads of disease, first of all scab and then the prevalence of redwater and other tick-borne diseases have both reduced the sheep population and deteriorated the quality of the wool. One result of the late war in the central and eastern provinces was a great distribution of cattle diseases of all kinds owing to the breakdown of fences, the intermingling of clean and healthy stock, and the general neglect. Much of the land is unhappily infected with ticks, and these have been proved to be the intermediate hosts of a number of blood parasites of a fatal character. Nothing but the strictest isolation, constant dipping in arsenical washes to keep the animals free from ticks, burning off long grass, and other methods of keeping down ticks, can ever free the country of these diseases. Unfortunately the process is slow, and the individual who takes up the task seriously may find all his labours nullified through the carelessness or apathy of a neighbour, even though the latter may be coerced by government into remedial measures.

Passing eastwards and northwards along the coast towards East London the climate of the coast plateau changes, and though the total rainfall is higher its effect is low because so much of it falls in heavy thunderstorms during the summer months. The vegetation is markedly xerophytic, many of the plants being armed with severe thorns. The agriculture resembles that of the eastern districts, sheep providing the chief sources of revenue,

until towards the Natal border the climate finally becomes too hot for sheep.

Still farther north in the coast belt of Natal we enter a semi-tropical country, though for the tropics the rainfall is comparatively low, little more than 40 inches at Durban. The vegetation still possesses a xerophytic character, but many plants characteristic of the warmer countries now flourish, as for example bananas, guavas, loquats, sugar-cane, sweet potatoes, tea, and coffee. There is a considerable local trade in fruit and vegetables, though little is exported, and this industry is tending to fall into the hands of Asiatic emigrants from the Madras coast. There are several sugar factories, but the climate both in heat and humidity does not permit as rapid a growth as is obtained in typical cane-growing countries, and the local produce only maintains itself against the competition of Mauritius sugar through the help of protective duties and differential railway rates. About 6,000 acres are under tea, the centre of the industry being Kearsney, about 40 miles north of Durban; the yield compares favourably with that of India and Ceylon, but with the high cost of labour the product is not available for export. Coffee is not grown commercially in Natal, and cotton has not as yet been successful on a commercial scale, but indigo has been grown for some time and the acreage is now being considerably extended. Inland towards the great escarpment which forms the edge of the central plateau—the high veld—the land rises into an undulating country, somewhat drier and much colder than the coast belt, suitable for most classes of farming but still in the main pastoral. Mealies (maize) and Kafir corn (millet) are the chief crops, but on the foothills one of the most notable agricultural enterprises is the growth of the Black Wattle, introduced from Australia, for its bark, which when dry contains 30–40 per cent. of tannin. Some 50,000 acres are under wattle in the colony; it may be cut after 8–10 years growth, and after barking the timber is sent on to the mines. The very rapid growth of many of the Australian species of

Semi-tropical coast-belt of Northern Natal.

Eucalyptus and Mimosa when introduced into South Africa has been remarkable, even on the driest soils of the veld. Eucalyptus have been known to grow to a height of 80 feet in eight years. The native forests have been supplemented by the plantation of considerable areas of Eucalyptus to supply the railway sleepers and pit wood, for which there is an enormous demand, one that has already denuded the country of most of its indigenous timber of any size. In the neighbourhood of Cape Town, European trees grow freely, oak and elm for example, though the wood ceases to have much value; the Stone Pine again has become one of the most characteristic features of the Table Mountain landscape.

The High
Veld.

The most distinctive as well as the most extensive agricultural area in South Africa is the Veld, the elevated plateau approached from Cape Province by crossing the Nieuwveld Range to the north of the Great Karroo and bounded on the east by the great eastward-facing escarpment ranging from Griqualand to the borders of Natal, through Zululand and Swaziland to the Zoutspansberg and further north still. The Veld proper is an undulating plateau of gentle slopes increasing in elevation from west to east up to 11,000 feet on the Natal border. The rainfall similarly increases from west to east, from the absolutely desert conditions which prevail in Namaqualand and the Kalahari desert to a rainfall of over 35 inches in Basutoland and the elevated country adjoining the escarpment. The greater part of the rain falls in the summer; the winter is cloudless; towards November fall the first 'ploughing' rains, and the precipitation increases in January and February. In the winter night frosts occur, though more than 10° or 12° F. below freezing point are rarely registered. The soil of the veld is mostly a red gritty soil full of small nodules of iron-stone; sour 'brak' soils containing alkaline salts occur in patches, and 'vleis' are not uncommon, depressions covered with a tenacious black soil rich in organic matter and alkaline in reaction. The veld soils are easy to work and powdery, when they have once been brought under

cultivation, but in their natural state they set with a very hard crust. Chemically speaking, they are deficient in humus and are also short of carbonate of lime. The typical veld is covered with coarse tufted grasses showing the bare earth between ; there is no close matted sward such as is found in Western Europe, and with the closest attention to grazing it is difficult to obtain a real turf. Growth is exceedingly rapid as soon as the rains begin, and a luxuriant vegetation springs up immediately, but during the long drought of the winter the land carries little that affords any nutriment to stock. On the better land the grasses put on a characteristically red aspect, the ' rooi ground '. In the Transvaal the country below 4,000 feet in the basins of the Olifant's and the Limpopo rivers is generally covered by scrub and is known as the Bush Veld, but much of it is not healthy and has not been settled like the High Veld. All over the Veld water is scarce, the smaller streams only run during the rains, and the farmer must depend upon water collected by a dam to carry his stock through the dry season. Only in the neighbourhood of the larger rivers can irrigation be practised, but where the land can be put under water it becomes extremely fertile and large crops can be grown.

Under these conditions the agriculture is very largely of a pastoral character, sheep being more abundant in the Orange Free State and cattle further north, the proportion of cultivated land being comparatively small. The typical Boer farm was of great extent, 2,000-10,000 morgen, over which the cattle ranged at will and were only occasionally rounded up and selected for breaking-in to the ox teams, sale, or slaughter. Close to the homestead the native boys who were allowed a location on the farm cultivated a few acres of mealies (maize), paying over half the crop as rent, and this with the patch of peaches and oranges constituted the only cultivated land on the holding. The farmers' wants were few. Coffee and sugar were purchased on the occasion of the annual trek to the seat of government ; latterly, as native labour grew more scarce, imported condensed milk was also

Pastoral
character
of Veld
agricul-
ture.

purchased because of the difficulties involved in maintaining and milking a herd of cows in enclosed paddocks close at hand. This primitive pastoral farming was rudely shaken by the arrival of the rinderpest in 1896-7, followed by the ravages of the tick-borne diseases, redwater and East African coast fever, which were widely disseminated through the war. The operation of these diseases not only reduced the cattle stock of South Africa to a very low ebb, but made the old method of allowing cattle to run semi-wild over large areas impossible. The cattle had to be confined so as to be able to isolate healthy stock and prevent the transmission of disease from one herd to another; moreover, constant dipping and attention are needed to destroy the ticks which carry so many of the South African cattle diseases.

Dry
farming.

The losses they had suffered and the difficulties attending cattle rearing turned the attention of many of the veld farmers to the raising of crops, and in spite of the deficient rainfall, it has been found that the land can be made very productive by applying the principles of 'dry farming', i.e. continuous cultivation to keep the surface loose but at the same time to consolidate the lower soil after it has once been broken up, so as to render available to the plant whatever water may have been stored in the land. Under this system wheat is beginning to be grown, with some success; on irrigated land oats are grown to be cut for green fodder or for hay, but the staple crop is maize (mealies). Considerable attention has been given to the selection and distribution of improved varieties of maize by the various departments (now consolidated in the Department of Agriculture of the Union of South Africa), with the result that after supplying the local demands, and they are considerable because the chief food of the natives employed in the mining compounds is maize, a valuable export trade with Europe has been built up. The Department of Agriculture puts on sale at all railway stations standard maize bags for export, it grades and inspects the consignments of each farmer, watches over

the transit and conducts the sale in the European markets, where in consequence of the careful inspection South African maize now commands the leading prices. The other cereals grown are various forms of millet or Kafir corn, but none of them command more than a local sale. In the east of the Orange Free State and especially in Basutoland, the increased rainfall and the lower summer temperatures permit of the growth of wheat in the ordinary way, and as varieties suitable to the climatic conditions are evolved, this upland area will become the granary of South Africa.

The chief desideratum for veld farming is a fodder crop ^{Veld fodder crops.} that will remain green during the dry and cold winter; the natural grasses, however nutritive during their spring growth, leave nothing but a harsh tuft of dry grass of low nutritive value during the winter, hence the cattle have either to get through this season in a greatly reduced condition or be hand-fed with maize stores, oats, hay, &c., grown on the cultivated land during the summer. The difficulty of establishing a continuous turf is accentuated by the habit which has long prevailed of burning the veld towards the close of winter before the first rains fall. This practice gets rid of the old weathered tufts and enables the stock to bite the first young shoots; it also helps to reduce the number of ticks, &c., but it tends to kill out the finer grasses and by destroying so much carbonaceous matter and nitrogen compounds which should find their way back to the soil it steadily reduces the fertility of the land. None of the native grasses has proved very amenable to cultivation, nor do any of the European grasses answer well except perhaps Cocksfoot in a few favoured localities, but with careful sowing and after management true pastures providing some winter keep have been established with New Zealand tall Fescue, *Paspalum dilatatum*, and *Phalaris bulbosa*. Lucerne has proved difficult to establish on the dry veld, but where there is some moisture below, and especially on irrigated land, it yields enormous crops of very valuable fodder.

Stock-
farming
and
diseases of
animals.

One of the greatest difficulties from which South African farming suffers is the prevalence of disease among all kinds of domestic animals, diseases which are nearly always contagious, though they are more generally caused by some blood parasite instead of the bacteria more common in Europe and America. Horse-breeding has long been one of the chief agricultural industries, the country being very suitable for the production of a tough and hard-working pony or cob. The country, however, has been repeatedly ravaged by what is known as horse-sickness (paard-ziekte), and in recent years many parts of the country have become uninhabitable by horses owing to this cause. Horses that recover become immune, and a method of immunization has been worked out and is now in widespread operation, but it will be a long time before the country becomes really healthy for horses. In the low-lying and warmer districts, as in parts of Zululand and the bush veld and all over tropical Africa, horses are liable to a trypanosome disease (*nagana*) distributed by the bites of the tsetse-fly, and horse-keeping is practically impossible in the regions where the fly occurs. Mules are also affected by both horse-sickness and *nagana*, though not to the same degree, and donkeys, which are bred to some considerable extent in Bechuanaland, are to all intents and purposes immune. Glanders is another horse disease very prevalent in South Africa, against which again a vaccine has been prepared. It has already been mentioned that cattle have suffered greatly from recurring attacks of rinderpest and other diseases. Of these rinderpest caused the greatest mortality; in some districts it was estimated that 90 per cent. of the cattle died, and the antelopes and other big game suffered equally, so that South Africa was suddenly deprived of the greater part of its meat supply. Rinderpest, however, is a plague that sweeps through a country and does not recur for some time; far greater disaster to the cattle industry is wrought by the diseases for which certain species of grass ticks act as carriers, the so-called redwater and East African coast fever. Cattle

sometimes recover from the former, but the latter is almost invariably fatal. A preventive vaccine has been prepared against redwater, but the stamping out of East Coast fever depends on the preliminary eradication of the tick. Other tick-borne diseases exist, and cattle in South Africa also suffer from anthrax and blackwater; animals freshly imported from Europe are particularly liable to attack, and particular care should be taken to get them through the early months after their arrival by preventive vaccinations and great care to keep them free from ticks. Dipping the animal in some arsenical solution at comparatively short intervals, even every three days, has proved the only way of killing off the ticks before they can inoculate the animal with the disease, and if such a plan were adopted by every one for a few years there is every reason to suppose the diseases conveyed by the tick might be suppressed entirely, because the parasite must die out if the necessary cycle of transmission from insect to animal and back again to insect is broken. Another difficulty with imported cattle arises from the presence in the veld vegetation of various poisonous plants, tulips, which acclimatized cattle have learned to avoid or to eat with impunity. The typical South African cattle belong to the long-horned dun-coloured Afrikaner breed, doubtless in origin a mixed race containing a considerable infusion of oriental blood, one result of which may be seen in the distinct hump they still possess. The Afrikaner stock has been much crossed, most generally with the black and white Frisian or Holstein cattle, but also with various British breeds, and through the necessity of renewing the cattle stock of the country after the war, a number of pure-bred herds of European origin have been established. But for the rougher grazing, and especially in the hotter northern districts, a large proportion of Afrikaner blood is considered desirable. Sheep-farming, which, as mentioned above, forms an important part of the industry of the eastern districts of the Cape Province, is also general in Orange Free State towards the east and in the higher

and cooler districts of the Transvaal. The native Cape sheep is a hairy thick-tailed animal, and doubtless has formed the foundation of many of the colonial flocks, which are now, however, typically Merino in character. Since the war other breeds have been introduced, Shropshires, Suffolks, &c., from Britain, and Persian and other oriental breeds from the hotter parts of Africa. Sheep in South Africa are also subject to a number of diseases besides scab, several of them being transmitted through ticks like the cattle diseases. Goats are numerous in South Africa and will thrive on poor land where sheep cannot exist. They are most numerous in the Karroo, but are also common in the Orange Free State and the Transvaal, a considerable export trade in mohair resulting therefrom. The most valued breed is the Angora.

Agricul-
tural
prospects.

It will thus be seen that South Africa as an agricultural country suffers from many disabilities that are not experienced in other parts of the world that are being opened up for settlement. In America, both north and south, in parts of Australia and New Zealand, it has been possible to grow crops of wheat and thus pay immediately for the cost of clearing and bringing the land under cultivation and preparing it for more intensive forms of agriculture. Even when the country was too rough or too dry for wheat-growing, cattle and sheep would thrive when ranging with a minimum of attention, and thus has laid the agricultural foundations of New Zealand, parts of Australia, and North America. Owing to the prevalence of disease in both animals and plants, neither resource has latterly been open to the South African farmer; moreover, the presence of a native population creates a feeling against the white man labouring with his own hands, yet the demand from the mines has raised the price of Kafir labour to a point the farmer finds difficult to pay. The market gardening and *petite culture* in the neighbourhood of large towns like Johannesburg has fallen almost entirely into the hands of poor Portuguese and of Indian immigrants in Natal. No great extension of irrigated land is possible because of the

absence of ranges of mountains furnishing a perennial supply of water. The agricultural ventures which seem to promise most brightly from the point of view of an export trade are the maize-growing of the veld country, orange-growing on all the warmer and better watered lands, the tobacco-growing of the Magaliesberg district in the Transvaal and the Oudtshoorn district in the Cape Province, ostrich-farming in the Karroo, and the fruit-growing of the favoured districts at no great distance from Cape Town.

Further reference to the economic position of agricultural industries will be found in the following chapter.

CHAPTER VI

ECONOMIC CONDITIONS AND COMMUNICATIONS¹

BY THE HON. SIR RICHARD SOLOMON.

SOUTH AFRICAN agriculture² has never received so much attention as is now being paid to it, although judged by the volume of output in relation to the immense possibilities of the country the industry can only yet be regarded as in its infancy. A country with a population of nearly 6,000,000 (black and white), which imports food-stuffs to the extent of £6,500,000 sterling per annum, has still a good deal of leeway to make up before its position as an agricultural country can be said to be at all satisfactory. Nevertheless, despite the peculiar conditions of the Union, such as the difficulties of transport, the unprogressive

Economic
position
of agri-
cultural
industries.

¹ The Editors desire to acknowledge, as well on their own behalf as on that of the late Sir Richard Solomon, the collaboration, in this chapter, of the following authorities: On the agricultural and other industries except that of mining, and on commerce, the Customs Department of the Union; on the mining industry, Mr. Warrington Smyth, Secretary to the Department of Mines; on railways, ports, and harbours, Mr. Hoy, General Manager of the South African Railways; and on posts and telegraphs, Mr. Wilson, Postmaster-General of the Union.

² The distribution of agricultural industries and crops, and a review of the general agricultural conditions, are discussed in the preceding chapter.

methods of much of the rural population, and the deplorable prevalence of animal diseases, development during recent years has been fairly satisfactory. Unfortunately, there are no reliable statistics available regarding the acreage under cultivation prior to union, but there are over 4,250,000 acres under crops of one kind and another, in addition to vineyards, orchards, and vegetable gardens, in extent 12,000 acres. The total area of arable and pasture land actually in commission amounts to more than 180,000,000 acres. Of the cultivated land, there are about 1,000,000 acres under irrigation.

Particular industries, such as the production of sugar, wheat, maize, wool, ostrich feathers, and wattle bark, have in each case during recent years reached their highest level.

Sugar. In 1907 the output of sugar from the Natal plantations was returned at 35,000 tons ; in 1911-12 the crop had increased to 90,000 tons, and with the opening up of the rich alluvial sugar lands of Zululand it is more than possible that the planters will soon not only supply the entire sugar consumption of the Union (which amounts approximately to 130,000 tons), but will have a surplus for which an outlet will have to be sought in the markets of the world.

Ostrich-farming. An industry which is closely allied to that of agriculture, and ranks high in the order of importance of South African exports, is that of ostrich-farming. Feathers to the value of £2,253,000 sterling were exported during 1911, representing a total weight of 826,992 lb. The number of birds in the Union is approximately 750,000, the greater portion of which are owned in the Oudtshoorn, Albany, and Uitenhage districts of the Cape Province.

Tea. The tea industry of Natal has had since 1862 a precarious existence. Capital to the extent of £250,000 sterling is invested in the business, and upwards of 6,000 acres, producing from 1,000 to 1,500 tons of tea, are at present in full bearing.

Wine. The wine industry is almost exclusively confined to the Cape Province, where there are upwards of 4,000 wine

farmers. The annual value of the output is estimated at £250,000 and the value of the wine converted into brandy and spirits at £208,000. The export of Cape wines amounts to little more than £13,000 per annum. It is interesting to note that between the years 1841 and 1850 these wines enjoyed a considerable preference on the English market, with the result that the value imported into Great Britain during that period amounted to about £470,000. For the following ten years the figures had risen to over £800,000, but with the withdrawal of the preference the trade gradually dwindled to the most insignificant proportions. The census figures of 1904 showed a total production of over 5,500,000 gallons. In 1911 the amount had increased to 7,500,000, practically the whole of which, in the form of either wine or spirits, finds a ready sale in the country. There is still considerable room for expansion (apart from an export trade, which at present, however, is more or less out of question), seeing that European wines are also imported to a considerable value.

In regard to maize, for the growth of which South Africa is peculiarly suited, there has been rapid development on every hand. This has been mainly due to the facilities which have existed since 1907 for export. In that year, by arrangement with the shipping companies, it was made possible for maize to be loaded up at the railway station nearest the farm and carried to Europe at a total cost of approximately £1 per ton. During the first year, 46,000 tons were exported under this arrangement, but the two following years (1909-10) witnessed a very considerable increase, the export reaching as much as 178,000 tons, valued at nearly £700,000. Owing partly to dry seasons and to the more extended use of the grain locally for feeding purposes, the two years following showed a slight falling off in export. The total yield of maize during 1911 was 770,000 tons, compared with 360,000 tons in 1904.

The production of wool and mohair has always been one of the most promising of South African industries. There

Wool and
mohair.

are nearly 31,000,000 sheep of all classes in the Union, which is double the number disclosed by the census figures of 1904. Goats, a large proportion of which are of the Angora class, number 12,000,000.

Wheat.

In regard to wheat, the Union is barely producing a third of its present requirements, but every year, as in the case of maize, the wheat-growing areas of the Union are being developed, and the recent falling off in the amount imported indicates a gradually increased local production. In 1904 barely 700,000 muids¹ were produced, while the production in 1911 was officially returned at over 1,800,000 muids. There are thousands of acres of fertile soil in the south-west portion of the Cape Province and the grain districts of the Orange Free State which are admirably adapted to the cultivation of wheat. These lands are practically lying dormant, but their value is becoming more and more recognized, and in cases where property of this nature has recently changed hands very high prices have been obtained. In fact, the enhanced value of agricultural land everywhere throughout the Union is perhaps one of the most marked features of its present development.

Develop-
ment of
agricul-
tural
resources.

Everything points to a continued development of the agricultural resources of the country. The former governments of the separate colonies did as much as their means would allow to stimulate interest in this direction, and from the experimental colleges for many years past has gone out a band of young colonists well equipped in every branch of agricultural science, whose example cannot have failed to have the best possible results in those districts in which they have worked. The Union Government has succeeded to the responsibility of fostering agricultural interests, and has fully recognized its duty in this respect. For the year 1912-13, an expenditure of more than £750,000 sterling was allocated under the triple heading of 'Agriculture, Agricultural Education, and Forestry'. This, moreover, takes no account of the large sums which

¹ A muid = 200 lb.

are being spent upon irrigation works, nor of the activities of the Union Land Bank.

The modern history of South Africa may be said to have begun with the discovery of diamonds in 1871 in the neighbourhood of Kimberley. Vigorous development soon followed and Kimberley became the centre of commerce and finance in South Africa and was the goal of all energetic immigrants who intended to carve a career different from the old pastoral life which had been followed by the English and Dutch settlers for two centuries. Kimberley started the development of the north. A year later pioneers in the Eastern Transvaal discovered gold, and with the development of the Barberton and Pilgrims Rest fields gradually pressed on westward¹. In 1884 the conglomerates of the Witwatersrand were discovered, with their high gold-bearing values, and there opened the second chapter, which may be said to have led up to the war and to the Union of the four colonies in 1910.

Mining industries :
discovery and development.

As might be expected from their remarkable growth and detached situation in the midst of a vast pastoral country, the mining fields of the Witwatersrand have profoundly affected the history of South Africa and have been concerned in every important social and political problem in the sub-continent, and they must long constitute the commercial centre of the Union, towards which all business tends to gravitate.

Three years after the discovery of the so-called banket Gold beds in the neighbourhood of what is now Johannesburg the gold output amounted to just under £170,000. No regular figures were kept until 1893, when the total tonnage milled was 2,215,413, for a return of 1,221,171 fine oz., valued at £5,187,206. In 1898 the tons milled rose to over 7,000,000 for a return of gold valued at £16,241,134. It was not until 1903 that the industry had sufficiently recovered from the war period to approach previous figures, and the output for that year amounted to a value of £12,628,057. Since that date there has been

¹ See L. V. Praagh, *The Transvaal and its Mines*, Johannesburg, 1906 ; J. P. Johnson, *The Ore Deposits of South Africa*, London, 1909.

a steady increase, and the total output for the Union for the year ended December 31, 1911, amounted to the following : fine oz. 8,251,240, valued at the unprecedented figure of £35,031,041. This output was made up as follows :

	<i>Fine Gold.</i> oz.	<i>Value.</i> £.
Witwatersrand District	7,910,033·981	33,599,689
Heidelberg „	72,095·420	306,242
Klerksdorp „	30,602·066	129,989
Ottoshoop „	1,411·640	5,996
Pretoria „	144·296	613
Barberton „	91,710·113	389,560
Pilgrims Rest „	140,760·871	579,914
Pietersburg „	2,703·031	11,482
Cape	73·052	310
Natal	1,705·880	7,246
Orange Free State	—	—

The most important of the Transvaal mining areas outside the Witwatersrand, as will be gathered from the above table, are those of Pilgrims Rest and Barberton. Mining in the Pilgrims Rest district is chiefly in the interbedded so-called 'flat' reefs which occur in the Dolomite and Black Reef series which lie above the older granites of the Low Country and below the rest of the Transvaal system in the eastern escarpment of the High Veld; while in the Barberton district the mining is generally in steeply inclined quartz reefs formed along zones of sheering, and generally in irregular 'chutes' as regards their gold contents. Both districts offer good opportunities for the small miner or small syndicate running from five to ten stamps. These districts suffered in the past from too much speculation and from over-capitalization of the small mines with but small mineral reserves, and for a long time these districts had only one or two concerns making a successful fight with the local difficulties which are inevitable in mining districts off the main lines of railway. By degrees, however, a good class of miner has opened up and developed the large number of promising small properties, although it is to be regretted that the dangers of over-capitalization and the presence of specu-

lators are still evident, especially in the Pilgrims Rest District.

The gold industry of the Cape Province, Orange Free State, and Natal is negligible, there having been only one mine in Natal dropping stamps during 1911.

More than sixty mines, scattered along the fifty miles of the northern outcrop of the Main Reef series of the Witwatersrand beds, contribute by far the largest portion of the gold output of the Transvaal province. The principal reefs in this series which are most persistent and most definitely defined are the Main Reef, the Main Reef Leader, and the South Reef. Of these the two last are the more important, the South Reef being in most districts the most generally worked. The Main Reef itself, while the largest of the three and generally carrying gold values, is only worked in places where its values are above the average, or where it can be conveniently worked in conjunction with the Main Reef Leader.

The rocks of the Witwatersrand system are older than most of the other Transvaal formations, by which they are overlain, and they rest on the older granite with associated schists and other metamorphic rocks. They are divided generally into two divisions, of which the upper consists almost entirely of quartzites, grits and conglomerates, with small bands of slates or shales. It is these conglomerates, which occur practically throughout the division, which give them their interest to the miner, and of these the most important is the Main Reef Series referred to. The other series of conglomerates of the upper Witwatersrand beds, though frequently auriferous to some extent, are rarely workable over any considerable area, although one or two have been worked at various times under the names of the Battery Reef on the West Rand and the Steyn Estate Reef. In the lower Witwatersrand system conglomerate beds occur on several horizons which are auriferous to some extent and have been worked, or at least prospected, along the lines of the Government and Promise Reefs, though without very satisfactory results. Considerable prospecting has been done in other areas

where the Witwatersrand system occurs, especially about the horizon of the Main Reef Series, but hitherto similar values to those on the Witwatersrand outcrop have not been found.

The comparative regularity and permanence of the values of the Main Reef Series on the Rand are unique of their kind. While, from the point of view of mining, various sections of the reef series are extremely varied in their gold contents, the fact remains that generally the value is well maintained from east to west and on the dip. As a result of the tremendous operations which have been carried on, many of the old outcrop mines are coming to an end of their lives and the depth at which work is carried on is increasing rapidly on all sections of the Rand, the deepest mine, that of the Jupiter Gold Mining Company Ltd., being worked at a depth of 5,000 feet. Promising strikes on the far East Rand have done much to counterbalance some disappointments in depth at points nearer to the Central Rand, and there seems to-day every indication that the place of outcrop mines, the lives of which are generally coming to an end, will be taken by some large producers which will be ready to add to the output, especially east of the East Rand Proprietary Mines and on the dip of the more central portions of the Rand, and it is likely that mining will take place at depths which will considerably exceed 5,000 feet. It is impossible to enter here into the vexed question of the increased costs likely to be caused by mining at greater depths, or into the problems connected with the mining of large blocks of lower grade ores or with the 'big mill' policy, and their effect on the all-important subject of reduction of costs.

Acci-
dents and
disease in
gold-
mining.

The gold output of the Union represents approximately 36 per cent. of the total gold output of the world, while the total gold output from the beginning of operations to the end of 1911 may be placed at £325,128,500, and the total dividends declared from 1887 to the end of 1912 amounted to nearly £90,000,000 sterling.

The disquieting feature about the gold industry in the

Witwatersrand is the very high accident-rate. In this connexion it must be remembered that not only are very large tonnages broken in these mines, but a large percentage of the labour is totally unskilled, and there is too often ignorance of the inherent dangers of mining. Both causes have undoubtedly contributed to the unfortunately high rate of accidents, but a third cause has probably contributed to a measure which has not hitherto been appreciated. Only in recent years has the extent of the ravages of the disease of miners' phthisis, among the workers in the dry mines of the Rand, been appreciated. A medical commission appointed by the Government ascertained, unfortunately without doubt, that the percentage of men affected is far larger than was anticipated. The death-rate from this cause has had a silent but powerful influence on the problems of obtaining skilled miners for underground work.

The disease is caused by inhalation of the fine dust produced in the hard quartzite by blasting and general work in the mine. The dust gradually solidifies the lung, and in the last stages of the silicosis of the lungs tuberculosis frequently intervenes. In the past the incidence of the disease has not been realized, for the reason that men could work, with comparatively little inconvenience, almost to the last. Large numbers of men, therefore, were suffering from the incipient states of the disease without recognizing the fact, and it was extremely difficult to bring home to them the urgent importance of damping down their working places and keeping water jets working on their drills. The stringent regulations which have been introduced with regard to the watering of dry mines underground are, undoubtedly, having a marked effect in the improvement of underground conditions, and it is hoped that, with the co-operation of mine managers and their staffs, the disease will be practically stamped out. The result will be a gain to permanence of employment and efficiency underground, and it is hoped that a marked improvement in the accident-rate will supervene.

The diamond fields of South Africa are situated in the Diamonds.

territory known as Griqualand West, in the northern portion of the Cape Province, in the neighbouring Free State districts of Fauresmith, Boshoff, and Kroonstad, and in the basin of the Vaal River on the north and west of these districts. Since 1902 the Transvaal has entered the list of producers by the discovery and development of the great Premier Mine in the Pretoria district.

The pipes in which the diamonds produced by the above mines are found have pierced the outlying strata and are filled with the unique eruptive material known as 'blue ground' or 'Kimberlite', decomposed near the surface to a yellowish brown and comparatively soft earth. There are, as a rule, abundant inclusions of various types of rock, such as granite, quartzite, quartz porphyry, diabase, shales, and dolerites, which are masses torn from the walls of the pipe during the volcanic outburst. There are also dark heavy rocks, rich in basic mineral rocks, such as olivine, garnet, &c., which are plainly inclusions derived from rocks situated at great depths. The blue ground is a very basic eruptive material, which has suffered considerable alterations through the agency of heated waters, and is now highly serpentinous. Certain minerals are invariably present in the concentrates derived from washing Kimberlite, such as bright green diopside, garnet, flakes of deep brown mica, and lumps of heavy black iron ore, known as 'carbon', with occasional rarer minerals such as zircon, and, economically the most important, the diamond. The distribution of the gem in the blue ground is by no means uniform, and its character in the different pipes is so different that an expert can invariably tell the mine from which any diamond has come.

The pipe is generally somewhat oval in form, though it varies considerably at different levels and is sometimes extremely irregular in plan. Some become elongated with depth, acquiring almost the appearance of a vast fissure, while others narrow inwards considerably, especially at first, but with depth on the whole pipes seem to acquire fairly constant cross sections.

The production for 1911 is taken as illustrating the distribution of the industry :

	<i>Carats.</i>	<i>£</i>	<i>Value per carat.</i>
De Beers Mines (Cape Province)	2,158,610	4,968,436	46s.
Premier Mine, Transvaal . .	1,802,090	1,426,890	15s. 10d.
Orange Free State Mines . .	797,600	1,608,647	40s. 4d

The outstanding point of interest in these figures is the difference in the value of the product of the various mines. In the De Beers mines it will be noticed that an average value of 46s. a carat is reached, the lowest attained being 34s. 7d., and the highest, for Du Toitspan Mine, 72s. No other stones approach in value those of the latter mine, the nearest being the New Jagersfontein, with 60s. 2d. per carat. On the other hand, as is well known to all diamond miners, the alluvial stones found in the valley of the Vaal River, especially in the deeper alluvial deposits, at a depth of 15 feet and upwards, obtain still higher values per carat than even the Du Toitspan stones. Many stones in the Barkly West district, the oldest and still the most flourishing portion of the alluvial fields, obtain 117s. per carat as an average, individual stones of course reaching much higher prices.

The output from the alluvial fields has been recently greatly increased by the discoveries of shallow alluvial diamond gravel in the neighbourhood of Bloemhof, in the Klerksdorp mining district of the Transvaal, along the northern bank of the Vaal River and extending twenty, and probably thirty miles inland. During 1911 and 1912 large numbers of diggers were attracted to this field, and it was estimated that at one time over 5,000 white diggers, with from 10,000 to 20,000 coloured workmen, were congregated in the neighbourhood of Bloemhof, and it spoke well for the orderliness of these workers that violence and crime were almost entirely absent. The tendency during 1912 was towards the breaking up of the bigger mining camps and the scattering of the diggers over the larger area over which the deposit is now found ; while a few have made good sums by finding large stones, the majority

find it hard to pay their way, and many who remain do so because they are unable to leave. The output of these alluvial diggings in 1911 was 41,248 carats, valued at £201,980, a value of about 98s. per carat.

To the visitor to any of the principal mines above mentioned probably the most impressive sight is the immense size and depth of the open-cast workings. That at the old Kimberley mine, practically in the middle of the Kimberley township, is a little over 1,000 feet deep; the immense craters at Du Toitspan and the other mines, owing to their superficial area, offer striking evidence of the value of the diamond in the markets of the world, but the largest of all these open-cast workings is the Premier Mine, which covers an area of not less than 3,482 claims, or 73 acres, and owing to its enormous size it has been suggested that it will be possible to work this mine to a depth of 1,500 feet in the open before it will be necessary to sink a permanent shaft outside the mine and attack it from below by levels, as is now done in all the De Beers mines.

It may be observed here that diamond-mining practice differs in many respects from that of mining for any other mineral; for instance, the miner for baser metal is at fault when he finds that the country rock is described as 'reef', and what he would call a 'horse' of country rock coming into the payable zone is known as 'floating reef' by the diamond miner.

The Premier Mine has departed in many respects from the methods hitherto adopted. Owing to the comparatively lower value of its product, it was essential to the life of the mine that mining operations should be on an enormous scale, and a system of direct treatment has been adopted in lieu of the old flooring methods formerly practised at De Beers and elsewhere. The system, while involving a large expenditure and much ingenuity of a mechanical kind, has been rendered necessary by the increase in the hardness of the blue ground in the deeper levels and the longer period which would have been required for exposure of the blue ground on the old flooring system.

The future of the diamond industry seems assured, as the demand remains steady. A reasonable restriction of output of this article of luxury is the keystone of the whole diamond trade. In this policy the De Beers Company has led the way throughout the history of the development of the diamond industry, and it is largely due to the policy of this firm that the alluvial digger and the other mines of the Union can obtain the prices at present ruling for their products.

The Coal Measures of South Africa have a very wide Coal. extent, especially in the Transvaal and Natal, but the productive coal seams are restricted to a comparatively small area of that which is covered by the Coal Measures proper. The Coal Measures belong to what is known as the Karroo system, and especially to what are known as the Upper and Middle Karroo.

The Upper Karroo contains, in what is known as the Stormberg series, the coal of the Indwe district of the Cape and the Komati district in the low country of the Transvaal. The High Veld coal-fields are situated in the Beaufort beds of the Middle Karroo, and, although the extensive shales of the Eccia series of the Lower Karroo have been prospected at great expense in various parts of the country where they are well developed, no payable coal has been obtained from them.

In the Transvaal it is estimated that some 3,000 miles of Coal Measures exist, but the coal seams are found over a much more limited area. The best known coal-field of the Transvaal is that of the Witbank area, from which the greater portion of the best coal is produced in that province. The smaller coal-fields of the Springs-Brakpan area, the South Rand, and Klerksdorp do not contain coal of the same quality as the Witbank area. It was largely, however, from the Springs-Brakpan area, alongside the gold mines of the Witwatersrand, that in the earlier stages of the Rand history the coal supplies necessary for the mines were drawn.

The Coal Measures in the Orange Free State, which are an extension of the smaller southern Transvaal fields,

cover a large area, but the workable coal is limited in extent.

After the Transvaal coal-field that of Natal comes next in importance. The extent of this field is comparatively large, but the doleritic or whin dykes and flows which are met with in every portion of this field have seriously affected the extent of marketable coal which it will be possible to mine in the future. The quality of the coal mined in this field, however, is superior to any other in South Africa.

Tin.

The tin deposits, which are a comparatively recent discovery in the Transvaal, occur either in the red granite or in different strata of the lower division of the Waterberg system, immediately above the old granite, and are, in most cases, situated close to or actually at the line of contact between the two classes of rock. The deposits are found along the belt of country forming the edge of the Waterberg system in the Potgietersrust, Warmbaths, and Rooiberg section of country. In the red granite the cassiterite occurs in the form of roughly cylindrical elongated pipes, or associated with irregular beds of altered granite following definite zones in the granite. They also occur in irregular disseminations in slightly altered granite and as impregnations along well-defined lines of fissure or in pegmatite or quartz veins. In the felsites, shales, and quartzites of the lower Waterberg tin occurs in lodes and more or less defined lines of fissure, and in leaders as well as in irregular patches and pockets.

The geological relations of the deposits tend to give them a more or less defined distribution along the main lines of the geological structure of the country. Further discoveries have been made considerably to the eastward of their known extension in the Warmbaths district. How far these deposits will extend in depth is problematical, but it seems probable that the majority will be found at or near the junction of the red granite and the overlying deposits, and at no great distance from that junction.

The greater portion of the copper in South Africa comes from the well-known mines in Namaqualand, which have been worked for half a century by the Cape Copper Company and by the Namaqua Copper Company. During that time the Cape Copper Company alone has paid over £4,000,000 sterling in dividends. The ore reserves of these mines show a steady diminution, but increased prospecting activity in the gneiss rocks of the Namaqua mountains may result in further discoveries. The Messina Transvaal Development Company is the only other copper producer of any importance. The mine, situated on a line of ancient workings near the Limpopo in the Northern Transvaal, promises to become an important producer.

Salt is mostly obtained in pans or lakes by evaporation of the brine, evaporation being done by solar heat. The production is entirely for domestic consumption. Each of the provinces yields such products as bricks, granite, sandstone, cement, &c.

In manufacturing industries South Africa has achieved no great results. From the meagre statistics of production available, it would appear that the approximate value of the output of manufactures is £20,000,000 sterling. This is made up for the most part of the production of a very large number of small scattered factories and workshops, numbering between 2,000 and 3,000. In very few cases does the value of the combined production of any single industry reach £1,000,000 sterling. Such, however, are corn-milling, sugar-refining, manufacture of explosives, bread, biscuit and confectionery works, breweries, and printing; these alone represent a total annual output of over £9,000,000 sterling, leaving the remaining £11,000,000 or £12,000,000 to be divided in varying amounts among a number of minor industries.

If it were profitable (which it is not) to search for the causes which have contributed to this industrial lassitude, very many valid reasons might be advanced. It is perhaps sufficient to state that the total European population of the Union, as ascertained at the census in 1911, was only a trifle over 1,250,000. Apart from about a dozen

towns, with populations of 10,000 or upwards, the urban population is made up of small and (in many cases) isolated towns and villages of 500 to 5,000 persons. The native population is omitted from consideration in this connexion, having regard to the fact that their social system is separate from that of the Europeans, and although their spending power is considerable in certain portions of the Union, their numbers are no index of their economic value for purposes of industries. The total European population is about equally divided between urban and rural districts, and in no case (unless we except Johannesburg) has there been that marked concentration of population which in other countries has so materially helped to promote industrial activity.

The chief centres of manufacturing enterprise have hitherto been the seaports, the combined population of which amounts to about 160,000 persons, or about one-fourth of the whole urban population of the Union. Many causes have combined to bring about this particular localization of industry. In the first place, South African industries have been, and still are, almost entirely dependent for their raw material on imports from abroad, and this, coupled with the cheaper labour obtainable at the coast, has resulted in the establishment of the greater proportion of industries on the seaboard. The incidence of railway rates prior to union worked in the same direction, but this last factor will ultimately disappear as through railway rates come to be adjusted.

The lack of population and the vast distances separating the chief markets have undoubtedly had the effect of limiting manufacturing enterprise, and until these conditions are considerably modified it is perhaps too much to expect any very substantial improvement.

Position
and
develop-
ment of
manufac-
tures.

There are abundant indications that, under definite and settled conditions as regards Customs, capital for industrial purposes will flow into the country, and with the gradual growth of population consequent on this development, and the continued extension of the railway system whereby the distant parts of the country will be

linked on to the producing centres, many of the disadvantages under which South African industries have hitherto laboured will be satisfactorily removed. The present circumstances of the country offer exceptional opportunities for the establishment of certain selected industries, the raw material for which is to be found ready to hand. The prejudice against the use of locally-made articles is gradually dying out, and manufacturers themselves are bestowing greater care on the quality of their wares. Municipalities throughout the Union, in their desire for increased population, are offering facilities to those who are desirous of establishing industries. In many cases, factory sites are available at nominal prices, and specially low rates are in most instances quoted for the supply of light, power, and water. To many oversea manufacturers the South African market is much too valuable to be lost, and there are several instances in which the pressure of even the existing comparatively low duties, coupled with increased local production, has led firms to enter within the barrier and to establish themselves as colonial manufacturers. Their enterprise has met with success.

No summary of the industrial situation would be complete without reference to the prevailing labour conditions. Except in the Transvaal, where attempts (more or less successful) are made to exclude all but white labour from skilled and partially-skilled employment, the proportion of coloured labour in factories and other industrial institutions throughout the Union is high. In the Cape Province industries are almost entirely dependent upon coloured or black labour. In Natal and the Orange Free State this tendency is perhaps less pronounced so far as skilled labour is concerned, but production, whether agricultural (as in the case of sugar and tea) or of manufactures (as in the case of soap, jam, creameries, shoe-making, and saddlery, &c.), is in both provinces largely the result of black labour. In this connexion it may be stated that out of the non-European population of 4,700,000, 678,000 are described as mixed and coloured, and these, as experience

teaches, are capable of a high degree of efficiency, entirely surpassing the aboriginal native.

Condition
of some
leading
industries.

It is unnecessary to detail at any length the many kinds of industries which have taken root in South Africa, but practically every branch of manufacture natural to a civilized society is represented in some measure, and the position of some of the more important may be summarized here. The total requirements of the country in regard to sugar will shortly be met within the country itself. The breweries are producing the greater part of the beer drunk in the Union. The explosive factories (with over 5,000,000 cases per annum) and the match factories (with a production of more than a million gross) are sufficiently supplying the local demand in their respective lines. The position of the tanning industry is by no means as flourishing as it should be, and owing to the high price of hides and the competition of foreign leather several tanneries have greatly restricted their output. The prospects of expansion in this industry, however, are good. South Africa has plenty of raw material suitable for the finest classes of upper leather, and instead of exporting it to Europe and America, there is no reason why it should not be manufactured in the country where it is produced. Unfortunately, under present circumstances, South Africa has to meet the competition of countries in which the manufacture of leather has been developed on an enormous scale under a policy of high protection. The principal vegetable tanning agents needed in this industry can be obtained in the Union in unlimited quantities. In connexion with the wattle-bark industry of Natal a serious fall in price has taken place. It is estimated that upwards of 200,000 acres of land in Natal have been planted with wattle, and, as there appears to be only a limited market for the bark, the increased production has been met by a corresponding reduction in price, and the future of the industry has been regarded with anxiety. It has been urged by representatives of the tanning industry in Great Britain and Europe that better results would be secured if wattle-growers combined

to export the tannin in the form of extract rather than in that of bark. The whaling industry has assumed large proportions in Natal, and in a lesser degree in the Cape Province. The peculiar type of vehicle characteristic of the country lends itself to local production, and not only is this industry well established in regard to the finer classes of work required for the towns, but practically every village in the Union has one or more carriage and wagon-building establishments. Woollen manufactures are but little developed, but the application of capital to this manufacture, drawing upon the home supply of raw material, offers good prospects. One of the most promising industries, which has advanced rapidly, is that of dairying. Tobacco manufacture is one of the largest industries in the country. The leaf grows well in most parts, and the yield for 1911 was nearly 15,000,000 lb., the Transvaal alone contributing upwards of 8,000,000. The value of tobacco manufactured during 1911 reached a total of more than £750,000 sterling. There will be occasion to refer further to this and certain other local manufacturing industries in the following paragraphs dealing with the commerce of the Union.

In 1908 the total value of imports of merchandise into British South Africa was £24,000,000. In 1909 the figures had increased by 11 per cent., followed by an even larger increase in 1910. In that year the imports reached £39,000,000, and in 1911, £36,000,000. Exports show a similarly satisfactory rate of progress, the total value of South African products (including gold and diamonds) in 1908 being £45,000,000, while in 1911 the figures stood at nearly £58,000,000. The prospects of the country, commercially and industrially, have never been brighter than at the present. For a great number of years mining interests and mining development, vast and important as they undoubtedly have been and still are, have been allowed to dominate too exclusively the minds and enterprise of a large section of the people of the country. It is now realized, however, that there exist other interests of equal, if not of greater potentiality, and that whereas

the mines are a diminishing asset, the resources of the soil offer a vast and profitable field for the investment of capital and the exercise of well-applied industry.

Perhaps the most satisfactory feature of the more recent trade returns is the confirmation they afford of the continued development of the natural resources of the Union. In the matter of a considerable variety of food-stuffs, including wheat and meat, the figures indicate that the country is becoming more nearly self-supporting, largely decreased importations being recorded, while, at the same time, it is seen that the instruments of husbandry are being imported in ever-growing volume. The importation of live stock also shows considerable increase, and with the facilities of free freight offered to farmers and breeders this particular item may be expected to increase rapidly from year to year. Increased importations of fencing wire, sheep dip, windmills, water-boring machinery, manures, and fertilizers all point to a more enterprising as well as a more expansive agriculture. The greater quantities of grain bags imported imply an increasing production of cereals. On the other hand, the importation of mining machinery shows a general decrease, due, probably, to the fact that most of the construction work of the mines is more or less complete. An interesting feature of the import returns has been the immense increase in the value of motor cars and motor vehicles, which is evidence of a wide development of this form of transport in South Africa. The satisfactory increase in building material naturally follows more prosperous conditions generally. The establishment of large soap works in the Union has made its effect felt, and so far as the commoner kinds of soap are concerned a heavy decrease in importation is recorded. There is also to be observed in this connexion a decrease in the importation of oils (castor, coco-nut, and cotton-seed), probably to be accounted for by the establishment in Natal and the Transvaal of extensive oil extraction plants, where coprash, ground nuts, and palm kernels, which are landed free of duty from the east and west coasts of Africa, are being crushed in considerable

quantities. Tallow also appears as a diminishing item in the list of imports, due perhaps to increased supplies obtainable in the country itself. Imports of manufactured tobacco and cigars show a not unexpected decrease, and as practically the whole of the tobacco crop is consumed in the country, it is not unreasonable to surmise that these items will continue to diminish. In regard to cigarettes, on the contrary, imports have increased, for the country does not produce in sufficient quantities a suitable tobacco to meet all requirements.

With regard to food-stuffs, the lessened imports, side by side with increased exports, afford ample testimony to the progress which has been made in agriculture. This has been dealt with in detail in the section on the economic position of the agricultural industries, and it need only be added here that the fruit trade has shown considerable advance of late years, and under the favourable conditions which now obtain in regard to cheapened transport to the European markets additional impetus has been given to this important branch.

Sufficient has perhaps been stated to indicate that South African commerce is travelling on sound lines. In no direction is there any outstanding record of development; the returns merely show the steady progress of a country gradually awakening to a realization of its resources and putting forward its best efforts, amid many obvious difficulties, to achieve its destiny.

Transport and Communications

An event of first-rate importance from a commercial point of view was the signing in 1912 of the ocean mail contract, together with the two subsidiary agreements respecting Government and other freights. The contracts were entered into for a period of ten years with the Union-Castle Mail Steamship Company, the former contractors, who bound themselves to observe the provisions of the Post Office Administration and Shipping Combination Act, which debar them from giving, offering, or promising to any person any rebate, refund, discount, or reward upon

Ocean
transport

condition that such person shall ship, or in consideration of such person having shipped, goods by ships of a particular line to the exclusion of any other.

For a great number of years, under the guidance of the late Sir Donald Currie, the 'Conference Lines', as the combination was styled, have held an almost undisputed sway over South African shipping. Attempt after attempt was made by outside companies to break through the barrier, but they invariably had to retire from the field beaten, or, if successful to the point of holding their own for a sufficiently lengthy period to become inconvenient, were glad to join the combination on the terms offered. In regard to efficiency of service and regularity of sailing, the Conference Lines, it must be admitted, have done good service to South Africa. Their system of deferred rebates, moreover, against which the Post Office Act was primarily directed, had one good effect in ensuring uniformity of rates. The country, however, had determined that the system, whatever its advantages, should be ended, and that shippers should be put in a position to avail themselves of the cheapest freight procurable unfettered by any such obligation as had previously existed.

The annual subsidy agreed upon between the Government and the Mail Steamship Company is £171,000, and the company undertake during the period of the contract to build at least six new mail steamers of 15,000 tons register. Under the speed clause, the contractors bind themselves to carry the mails from Southampton to Table Bay and *vice versa* in sixteen days fifteen hours. The Government, however, reserves the right to call upon the company to perform the voyage in sixteen days, on payment of an additional subsidy of £19,000 per annum. An important feature of the contract is the arrangement with regard to the maximum rates for certain perishable articles of export. Fresh fruit which has passed the Government grader is carried at 40s. net per ton of 40 cubic feet space; butter at $\frac{1}{2}d.$ per lb.; frozen meat at $\frac{3}{8}d.$ per lb.; and citrus fruits and pineapples at 25s. net per ton. Eighteen thousand

cubic feet space of cold or cool chamber accommodation must be provided in every mail steamer, and the contractors undertake to carry free of freight duly certified pedigree stock. There are several other conditions all alike favourable to the development of the export trade of the country.

The principal ports of the Union are six in number, namely, Cape Town, Simonstown, Mossel Bay, Port Elizabeth, East London, and Durban. There are also several small harbours of minor importance, among which may be mentioned, in geographical rotation, Walfish Bay, Port Nolloth, Knysna, Port Alfred, Port St. John's, and Port Shepstone. Ports and harbours.

Of the first six named, Cape Town, Port Elizabeth, East London, and Durban are the great gateways of the country's trade. Through them pass the bulk of its imports and its exports, each serving its own 'hinterland', and each participating to a greater or less degree in the trade of the interior, to which all have access by means of the trunk lines of railway of which they are the terminal points. Mossel Bay, though connected with the main line of railway from Cape Town at Worcester, has no trunk line of its own going directly inland, and its commerce is restricted to its own 'hinterland' district; while Simonstown, commercially unimportant, is a fortified naval station of the British Fleet.

Cape Town, the principal port of the Cape Province, is picturesquely situated on the southern shore of Table Bay. Behind it on the south the huge mass of Table Mountain rises like a wall, and shelters both the town and the bay from the prevailing south-easterly winds. Founded by the Dutch East India Company in the middle of the seventeenth century as a port of call for the revictualling of their fleets on the way to and from the East Indies, Cape Town gradually became an important trading port, as the settlement of the country progressed and trade developed, until the shipping visiting the port now aggregates over 3,500,000 tons net register per annum, with a total trade of over 1,000,000 tons of cargo landed Chief ports : position and trade.

and shipped. It retains, to a large extent, its original characteristic as a port of call, for not only is it the first port touched at by the vessels of the regular South African steamship lines, but it is much used by vessels trading between Europe and Australia and passing to and fro between South America and the East in search of freight ; and in addition to the revictualling trade, a large business has sprung up since 1910 in the supply of bunker coal, which is brought round the coast from the neighbouring province of Natal.

As the first South African port of call on the voyage from England, Cape Town, 6,181 miles from London, is the principal port for the landing and embarkation of passengers and mails for the inland provinces, as well as for those parts of the coastal provinces which are in direct communication with Cape Town by rail.

Simonstown, which is situated on a sheltered bay almost in the north-western angle of False Bay on the other side of the Cape Peninsula, is the naval base of the British Fleet in South African waters. The docks, which belong to the Admiralty, consist of a fine tidal deep-water dock and graving dock, the latter completed in 1911, with the necessary equipment for the refitting and repairing of men-of-war. The docks are not available for commercial purposes, and the harbour is of importance solely as a naval station.

Mossel Bay, 242 miles from Cape Town, is the first port of call after leaving Cape Town for steamers of the regular European steamship lines engaged in the South African trade and passing up and down the coast between Cape Town and Durban. The harbour is an open but sheltered roadstead, and there is a small tidal dock affording facilities for the loading and discharging of the lighters by which all cargo is transferred to and from the ocean-going vessels in the roadstead.

Port Elizabeth, situated on Algoa Bay, 428 miles by sea from Cape Town, was founded in 1820, and has rapidly developed in commercial importance. As a harbour it has few natural advantages, the roadstead being exposed to

the full force of the south-easterly gales, which are often of great severity at certain seasons of the year. Steamers up to 2,000 tons net register and sailing vessels of 2,000 tons, drawing about 21 feet, can be berthed alongside one of the jetties, but with the exception of small cargoes of coal imported coastwise practically the whole of the tonnage handled is landed and shipped by lighters.

East London, at the mouth of the Buffalo River, the lower reaches of which constitute the harbour, is the next port of importance along the coast, and is 131 miles distant from Port Elizabeth and 559 miles from Cape Town.

Durban, or Port Natal as it is still sometimes called, 253 miles from East London and 812 miles from Cape Town, is now the first port of the Union of South Africa, both as regards the volume of its trade and the facilities it offers for the accommodation of shipping. Its situation on a land-locked lagoon, with a deep-water entrance that is practicable at all states of the tide and at all times of the day and night, render it accessible to the largest ocean-going steamers trading in the southern hemisphere. There is practically no limit to the length of vessel that can be berthed alongside the quays, the greatest depth obtainable being $38\frac{1}{2}$ feet over a length of 1,000 feet.

Of the minor ports and harbours already mentioned, Walfish Bay, situated almost in the centre of the coast-line of German South-West Africa, is solely of strategical importance as an outpost of empire. The port is visited occasionally by men-of-war, but there is very little trade. This isolated enclave in foreign territory is dealt with elsewhere (see Chapter XX). Port Nolloth, 280 miles north of Cape Town, is the starting point of the Cape Copper Company's railway to the copper mines at O'okiep. Considerable quantities of copper ore and regulus are shipped to the United Kingdom. The whole of the port equipment belongs to the Cape Copper Company, which undertakes the landing and shipping of all passengers and cargo. Knysna, between Mossel Bay and Port Elizabeth, is in the centre of one of the forest districts and has

a small export coastwise trade in timber. Port St. John's, at the mouth of the Umzimvubu River, midway between East London and Durban, is another small port for coastwise trade. It serves a thickly populated native territory which is without rail communication. Port Alfred, at the mouth of the Kowie River, between Port Elizabeth and East London, and Port Shepstone, at the mouth of the Umzimkulu River, 80 miles south-west of Durban, are small ports on which considerable sums of money have been spent in the past in fruitless endeavours to develop them in competition with Port Elizabeth and Durban ; but their trade never developed to any extent, and the efforts to keep the harbour entrances open were gradually abandoned.

Railways. The railways of the four South African colonies which form the Union are of comparatively recent growth, practically the whole of the 8,391 miles of Government and private lines which were in operation on December 31, 1912, having been constructed within forty years before that date. At the end of 1872 there were only 63 miles of railway in existence, consisting of the Cape Town and Wellington line of $57\frac{1}{2}$ miles, with a short spur line of $5\frac{1}{2}$ miles to Wynberg, now a suburb of Cape Town. These lines, which had been built by private enterprise, were taken over by the Government of the Cape Colony in 1873, and thus formed the nucleus of the Cape Government Railways, now merged with the Government railway systems of the other colonies in the South African railways.

**Develop-
ment of
the
system.**

In order to understand the development of the Government railway system as it exists to-day, it is necessary to review briefly the events which led to the construction of the five main lines from the coast to the interior, for the network of railways which covers the country to-day is not the result of a gradual development from the coast belt towards the interior, but has been subsequently built up on the main lines, which were first of all pushed far inland to two definite objectives with little or no regard to the development of the intervening areas. The first of these objectives was Kimberley, which rapidly developed

into an important centre as the result of the opening of the diamond mines there in 1871. The second was Johannesburg, which sprang into existence with the discovery of the Witwatersrand gold-fields in 1886.

Following on the acquisition of the railway from Cape Town to Wellington in 1873, the Government of the Cape Colony at once undertook construction not only from Wellington, but also from the two other seaports of the colony, namely Port Elizabeth and East London, Kimberley being the ultimate objective in each case. Early in 1884, the lines from Cape Town and Port Elizabeth had both reached De Aar junction, a point 146 miles south of Kimberley, which was reached towards the end of the following year, while the line from East London had been completed as far as Burghersdorp, about 130 miles east of De Aar junction, and 30 miles south of the Orange River, the southern boundary of the Orange Free State. In the meantime railway construction had been proceeding apace in the neighbouring colony of Natal. The Government had in 1878 taken over a short suburban line of $5\frac{1}{2}$ miles at Durban, which had been built by private enterprise, and also opened the first section of the main line running inland towards the capital of Pietermaritzburg; and at the end of 1885, just after the completion of the line to Kimberley, the Natal main line was opened to Estcourt, 149 miles from Durban and 100 miles due south of the borders of the Transvaal, then the South African Republic.

In the following year (1886) the Witwatersrand gold-fields were proclaimed by the Government of the Transvaal and the centre of railway attraction shifted almost immediately from Kimberley to Johannesburg. Strenuous efforts were then made by the two competing colonies of the Cape and Natal to be the first to open up railway communication with the new gold-fields and to secure the major share of the rapidly developing trade. The main line from Port Elizabeth already had a branch from Naauwpoort (69 miles south-east of De Aar Junction) to Colesberg, which was only some 20 miles south of the

Orange River, the southern boundary of the Orange Free State. This branch was extended to the Orange River at Norval's Pont (328 miles from Port Elizabeth), and by arrangement with the Free State Government the Cape Government Railways undertook the construction of the 333 miles of railway right through that country to the Transvaal border at Viljoen's Drift, on the Vaal River, not more than 40 miles from the new gold-fields. The extension to Norval's Pont and the first section of 120 miles thence to Bloemfontein were opened in December 1890, and eighteen months later (in May 1892) the remaining 213 miles to the Transvaal border was completed. In the same month, the main line from East London, which had been extended across the Orange River at Bethulie, was linked up to the line from Port Elizabeth at Springfontein, 35 miles north of Norval's Pont, thereby placing the Transvaal in direct communication with both ports, as well as with Cape Town by means of the connecting link from Naauwpoort to De Aar Junction. Six months later, the final section of 40 miles from the Vaal River to the gold-fields was completed and a junction effected at Germiston with the isolated line of railway that had in the meantime been constructed along the Witwatersrand.

Meanwhile the Natal Government railways had also pushed their main line up to the Transvaal border and early in 1891 had reached Charlestown, 307 miles by rail from Durban and about 160 miles by road from the gold-fields, but it was not until four years later that the difficulties which arose with the Government of the South African Republic were overcome and the line from Natal was carried across the border and linked up with the main line from the Cape a few miles south of Germiston. Early in 1890, however, when the rail-head of the Natal line was still at Glencoe, over 200 miles away, and Kimberley was the nearest point on the Cape railway system, a private company, styled the Netherlands South African Railway Company, had opened the first portion of a railway along the line of the gold-bearing reefs of

the Witwatersrand. In the following year (1891) the same company opened the first section of a railway from the Portuguese border, forming an extension of the railway from Lourenço Marques on the harbour of Delagoa Bay, and thus giving the Transvaal independent access to the sea through a non-British port. The construction of this line was begun from the Portuguese end, but in 1892, when the main line from the Cape had reached Germiston, construction was also undertaken from that via Pretoria, the capital of the republic. The line was completed by the end of 1894, twelve months before the main line from Natal, which had reached the Transvaal border in 1891, was linked up with Germiston.

These lines form the main arteries of the Union Government railway system at the present day, and it is from them, as already indicated, that the network of connecting and branch lines has gradually been built up. The rapidity of the development of the railways has been especially marked since the conclusion of the Anglo-Boer war, and is clearly shown by the following table, which gives the number of miles of Government lines open at the end of each decade in each of the four colonies which are now comprised in the Union :

<i>Decade.</i>	<i>Cape of Good Hope.</i>	<i>Natal.</i>	<i>Transvaal.</i>	<i>Orange Free State.</i>	<i>Total.</i>
	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>
1872	63	—	—	—	63
1882	968	100	—	—	1,068
1892	1,891	378	163	385	2,817
1902	2,317	636	888	464	4,305
1912	3,490	1,053	2,197	1,106	7,846

The physical features of the five main lines from the ports to the interior are more or less similar, inasmuch as they all have to climb the mountain barrier fringing the great central plateau, the elevation of which is from 2,000 to 6,000 feet above sea-level. The main line from Cape Town makes the final ascent to the plateau through the Hex River Pass, rising 1,627 feet in 16½ miles to the summit, 3,193 feet above sea-level, 145½ miles from Cape

Town. On the other four lines the rise to the inland plateau is not so rapid, as the mountain ranges become more broken and irregular towards the east, the foot-hills extending over a wider belt of country. The ascent is more gradual, therefore, and is broken by frequent descents to slightly lower levels, although approximately the same elevation of between 3,000 and 4,000 feet is ultimately reached.

In addition to the Government railways there are 545 miles of privately owned railways within the Union, the principal of which are :

<i>Line.</i>	<i>Miles open.</i>	<i>Owner.</i>
Vryburg to northern border of Cape Province	112	Rhodesia Railways.
Worcester to Mossel Bay	205	New Cape Central Railway Co.
Port Nolloth to O'okiep	100	Cape Copper Co.
Grahamstown to Port Alfred	43	Kowie Railway Co.

Of these lines 178 miles are worked by the Government Railway Department, namely, the section of 112 miles from Vryburg to the Cape border, which forms part of the Rhodesian main line to Bulawayo, the whole of which (597 miles) is worked by the Union Government on behalf of the Rhodesian railways, and 56 miles of the smaller private lines. On the other hand, the New Cape Central Railway Company works, on behalf of the Government, the short section of line from Mossel Bay to George (32 miles), which is unconnected with the Government railway system, except by the New Cape Central Railway Company's line.

Equip-
ment and
traffic.

The standard or normal gauge of the South African railways is 3 ft. 6 in., although the first line built in the country, that from Cape Town to Wellington, was of the standard British gauge of 4 ft. 8½ in. A 2 ft. gauge has also been used to some extent, 466½ miles of branch lines out of the total Government mileage of 7,846 being of the narrower gauge. Of the private lines the majority are of the standard 3 ft. 6 in. gauge, the exceptions being the Cape Copper Company's line, which is 2 ft. 6 in., the South-

Western Railway Company's 2 ft. gauge line of 21 miles running inland from the little port of Knysna, and a short agricultural line of 8 miles in Natal which is of 1 ft. 6 in. gauge.

As might be expected in a country which is as yet but slightly developed and sparsely populated, and where the distances between the present centres of development are so great, the railways are almost entirely composed of single track, doubling only having taken place at or near some of the more populous centres. The development of the coal-mining industry in the Transvaal and Natal, both for bunkering and export and for internal consumption on the gold-fields, has severely taxed the capacity of the main line from the Natal coal-fields to Durban, the principal coal shipment port, and also of the line from the colliery district of the Transvaal to Germiston, the centre of the gold-mining area, with the result that the doubling of both lines has become imperative and is likely to be undertaken wholly or partially in the near future. All the 2 ft. gauge Government lines are single track and also all the privately owned lines, while of the 7,379½ miles of 3 ft. 6 in. gauge making up the rest of the Government system only 150½ miles are other than single track. In spite of the restrictions imposed by the 3 ft. 6 in. gauge the locomotives and rolling-stock on the Government lines compare very favourably in point of power, size, and capacity with those of broader gauge railways.

In regard to speed, the heavy gradients and sharp curves coupled with the narrowness of the gauge prevent anything in the way of high speeds being attained, from 45 to 50 miles an hour being practically the limit that is reached on some short sections under favourable conditions. On the long-distance runs the best average time is made by the limited expresses between Cape Town and Johannesburg, which accomplish the journey of 956 miles (via Kimberley) in 36¼ and 36½ hours, an average of slightly over 26 miles per hour. Of the short runs the best is the Johannesburg-Protoria service, the 45 miles with two

stops being accomplished in 75 minutes, or at an average rate of 36 miles per hour.

The main line coaching-stock is almost entirely of the side-corridor type, with separate four- and two-berth compartments arranged for combined day and sleeping accommodation; in the 2nd and 3rd class coaches the compartments are arranged with six berths. For suburban and branch line passenger traffic various types of stock are in use, the principal being the ordinary side-door separate compartment type and the side-door central corridor type. Dining saloons are run on practically all the through main line trains and also on some of the longer and more important branch lines. Wagon-stock of high capacity has been in use for a number of years.

Since the establishment of the Union, the rates and fares in the several provinces have been assimilated to a great extent and considerable reductions have been effected. Specially low rates are in force for the conveyance of South African produce both internally and for export, and also on coal for export and bunkering purposes.

Manage-
ment.

The chief executive head of the department is the General Manager, whose head-quarters are at Johannesburg. He is assisted by three Assistant General Managers, each of whom is in charge of one of the three systems into which the railways and harbours are divided for the purposes of executive control.

System A, which comprises the main line and branches from Cape Town to Vryburg (1,444 miles), as well as the section of the Rhodesia railways from Vryburg to Bulawayo (597 miles), is controlled from Cape Town, the Assistant General Manager stationed there also being in charge of the ports of Cape Town and Mossel Bay.

System B, which is controlled by the Assistant General Manager, Bloemfontein, includes the main lines from Port Elizabeth to De Aar, East London to Springfontein, and Naauppoort to the Vaal River, and all their branches (3,059 miles in all), together with the ports of Port Elizabeth (Algoa Bay) and East London (Buffalo Harbour).

System C comprises practically the whole of the lines in Natal and the Transvaal (3,311 miles) with the port of Durban (Port Natal), and is in charge of the Assistant General Manager, Johannesburg.

Under the divisional system, which was introduced soon after union was accomplished, the three systems were subdivided into eight divisions, system A into two, and systems B and C into three each. One division on each system is controlled directly from the Assistant General Manager's office, the other five being controlled by local Divisional Superintendents responsible directly to their respective Assistant General Managers. The Divisional Superintendents have entire charge of the whole of the 'transportation' service in their respective divisions; that is to say, they control the maintenance of way and works, the train and engine working or 'running', and the station or 'traffic' working. The construction of new lines and of important works on open lines is under the control of the Engineer-in-chief, whose headquarters are at Johannesburg, and who also exercises through his inspecting engineers a supervisory control over the maintenance of way and works on open lines. The maintenance of locomotives, rolling-stock and mechanical equipment, as distinct from its actual operation, is in charge of the Chief Mechanical Engineer, whose headquarters are at Pretoria, the principal workshops being at Salt River (Cape Town), Uitenhage (Port Elizabeth), and East London, in the Cape Province; at Bloemfontein, in the Orange Free State; at Durban and Pietermaritzburg, in Natal; and at Pretoria, in the Transvaal. In addition to maintenance and repair work, the construction of new coaches and wagons is undertaken to some extent at all the shops except Pietermaritzburg, but principally at Salt River, Durban, and Pretoria. The Stores Department has its head-quarters at Germiston, at the centre of the Witwatersrand gold-fields, an important junction where the main lines from the Cape through the Orange Free State, from Natal and from Delagoa Bay all converge, 8 miles east of Johannesburg. The principal stores dépôts

are at the same centres as the workshops, and also at Johannesburg and at Mafeking, on the Rhodesian section. With the exception of a small refreshment-room contract in Natal, the whole of the catering on the trains and at stations is undertaken by the department, the Catering Manager having his headquarters at Johannesburg, with an assistant at Cape Town. The whole of the railway advertising, public advertising on railway premises, and station bookstall work is also carried out by the department.

Railway
and
harbour
adminis-
tration.

The Constitution of the Union makes elaborate provisions with regard to the administration of its railways and harbours, with the view of avoiding the dangers which experience has shown to arise when a Government becomes responsible for the administration of commercial undertakings. Subject to the authority of the Governor-General the control and management of railways, ports, and harbours, are exercised through a board consisting of three Commissioners, appointed by the Governor-General for a period of five years, during which they cannot be removed from office except by the Governor-General for cause assigned, which must be communicated to both Houses of Parliament, and a Minister of State who is Chairman. The salaries of the Commissioners are fixed by Parliament and cannot be reduced during their term of office. All revenue from railways, ports, and harbours must, at least before the expiration of four years from the establishment of the Union, go into a separate fund and is to be used only for the purposes of these undertakings. Their earnings are not to be more than sufficient to meet the outlays necessarily incurred in their proper administration, and they are to be administered, as the Constitution says, 'on business principles', due regard being had to agricultural and industrial development within the Union and the promotion, by means of cheap transport, of the settlement of an agricultural and industrial population in the inland portions of the provinces of the Union.

Posts and
tele-
graphs.

The first establishment by the Government of anything in the nature of postal communication in South Africa

was in 1806, when a service maintained by Hottentot runners was introduced three times a week between Cape Town and Stellenbosch, 30 miles distant; but it is interesting to note that nearly 200 years earlier it was customary for captains of vessels trading to and from the East to place letters under conspicuous boulders on the shores of Table Bay (then known as Saldanha Bay) with a view of their being subsequently collected and conveyed to their destinations by other vessels passing in the opposite direction. In 1897 several stones which bear inscriptions indicating that they were so used were unearthed in the vicinity of the General Post Office at Cape Town. One, now deposited in the vestibule of the General Post Office, bears the following :

THE LONDON ARRIVED THE 10 OF M
HERE FROM SVRAT BOVND FOR
ENGLAND AND DEPARTED THE 20 DICTO
RICHARD BLYTHE CAPTAIN 1622
HEARE VNDER LOOKE FOR LETTERS.

The beginning of telegraph construction in the Cape Colony was in 1860, but it was not until July 1, 1873, that the lines were transferred to the control of the Government. In Natal, under an Act of 1863, the Government was empowered to grant a concession to a company for the construction of telegraphs, and in 1874, when the Government obtained possession of the company's lines, only one connexion existed, between Durban and Pietermaritzburg, a distance of about 51 miles. In 1876 the line to the north was extended to Kimberley, and in 1879 the Cape Colony and Natal were connected, establishing in the following year, by means of the East Coast cable, a connexion between Cape Town and Europe. In 1879 telegraph offices were opened at Pretoria and Standerton in the Transvaal; in 1885 an office was established at Barberton, and in 1886 and 1887 offices were opened along the Witwatersrand. In 1882 the first telephone exchange in South Africa was opened at Port Elizabeth, followed in 1884 by the opening of a similar exchange at

Cape Town, and in quick succession exchanges were established at all the principal towns throughout the Cape Colony, Natal, Transvaal, and Orange Free State. Trunk line communication has been established between all important centres. Separate postal and telegraph administrations were maintained in the Cape of Good Hope, Transvaal, Natal, and Orange Free State until May 31, 1910, when the Act of Union took effect and the four services were amalgamated.

The department is under the control of a Postmaster-General who is responsible to the Minister of Posts and Telegraphs. The head-quarters are at Pretoria. As soon as possible after amalgamation, steps were taken to assimilate rates and obtain uniformity of practice, but this could not be accomplished in all cases without fresh legislative enactment. On September 1, 1911, however, all previous post-office laws were consolidated in Act No. 10 of 1911, which enabled an adjustment to be made in all tariffs with the exception of those appertaining to telephones, which necessarily vary according to the relative importance of the benefits obtained by subscribers to the different exchanges.

Since 1876 the department has been responsible for the Anglo-South African mail contract. The first contract entered into, which came into force on October 1 of that year, provided for a regular weekly mail service, the passage between the United Kingdom and Cape Town to be completed in twenty-six days. The present contract with the Union Castle Mail Steamship Company has force for ten years from October 1, 1912 (p. 127).

Wireless telegraphic stations have been established by the department at Slangkop (Cape) and Durban (Natal). The normal range of the Durban Station is about 250 miles by day and 1,000 miles by night, whilst the higher power installation at Slangkop has a range of, approximately, 400 miles by day and 1,600 miles by night. These are the guaranteed ranges, but are greatly exceeded at night time by both stations. The telegraph lines encircle the whole of the Union and extend northwards to Rhodesia,

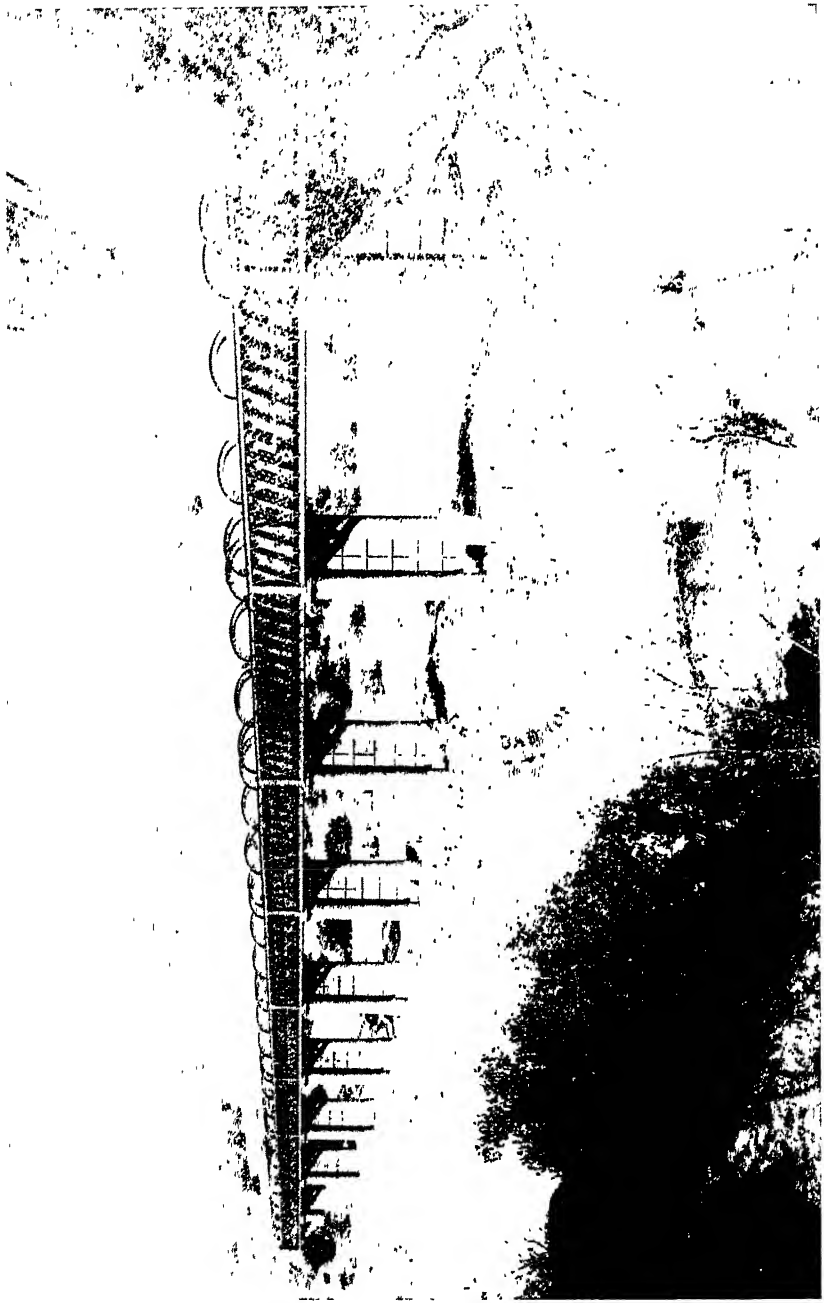


PLATE VII. THE ORANGE RIVER AT NORVAL'S POINT



PLATE VIII (a) CATHKIN PEAK



PLATE VIII (b). DEVIL'S CHIMNEY. NATIVE HUTS

(High Commissioner for South Africa)

westwards to German South-west Africa, and eastwards to Mozambique.

Mails are conveyed by every description of transport, from the aboriginal 'runner' to the modern motor-car and railway travelling post office. Across the desert in the north-west of Cape Province camels are employed. Money order conventions are in force between the Union and Austria, British East Africa and Uganda Protectorates, Ceylon, Commonwealth of Australia, Dominion of Canada, Germany, Hong Kong, Hungary, India, Mauritius, New Zealand, Norway, Nyasaland Protectorate, St. Helena, United States of America, and Zanzibar, while there is also a direct exchange with the United Kingdom. Savings Banks are conducted by the department at Cape Town (for the Cape of Good Hope and Orange Free State), Pretoria (for the Transvaal), and Pietermaritzburg (for Natal).

CHAPTER VII

THE PEOPLES OF SOUTH AFRICA

BY W. BASIL WORSFOLD

BRITISH South Africa is here taken as including (1) the Union, (2) Southern Rhodesia, and (3) the Native Territories under the direct control of the Crown. According to the census of 1911 the population of South Africa, so defined, is approximately 7,300,000; and this total is made up of 1,300,000 Europeans, 5,375,000 Bantu (or dark-skinned African natives), about 150,000 Indians and 475,000 'coloured persons' and Asiatics other than Indians. These figures at once distinguish South Africa from the other oversea dominions, Canada, Australia, and New Zealand; since here alone the European population is a small minority—rather more than one in five within the Union, and rather less than one in six in South Africa as a whole—and the great majority of the inhabitants are Natives and other coloured peoples.

And to this salient fact is added another scarcely less significant. The bulk of the European population is composed of two sections, respectively of Dutch and British origin, which are almost equal numerically, but speak different languages, have different customs and pursuits, and one of which—the Dutch section—up to 1902 maintained in part a separate political existence. In South Africa, therefore, the statesman is confronted by two very difficult problems: the administration of a backward, but numerically predominant, non-European population, and the fusion of two European stocks. Moreover, the Union of South Africa is not only weakened in counsel by racial division, but impeded in its development by an economic situation which is as baffling as it is unique. Elsewhere in the Empire aboriginal races, when brought into contact with European colonists, have dwindled or disappeared; but in South Africa the Bantu have multiplied and thriven under European administration. The presence of this preponderant dark-skinned population, unable, or unwilling, to provide manual labour sufficient to satisfy completely the industrial needs of the country, has had the effect of excluding hitherto the European from the unskilled labour market, and thereby prevents the Union of South Africa from offering a livelihood to the class of European emigrants which, as in the case of the other overseas Dominions, would otherwise have contributed most effectively to build up its European population.

The Aboriginal Races

Origins.

The period of effective European colonization begins with the establishment of a permanent victualling station and port of call by the Dutch East India Company at Table Bay in 1652. The aboriginal races with which the European settlers have come into contact from this date onwards are (1) the yellow-skinned Bushmen and Hottentots, and (2) the various branches of the dark-skinned Bantu. The two former constituted the 'native' population of the Cape Colony up to the close of the régime of

the Dutch East India Company in 1795; but to-day they have become practically extinct, as separate races, although the Hottentot stock has contributed largely to the population of mixed European and African blood known officially as 'coloured persons'. The latter, with the expansion of the area of European occupation, and after more than a century of costly and sometimes desperate wars, have been brought with varying degrees of completeness under the control of European officials; and having benefited physically by a modified introduction of European methods of government, now show a rate of increase slightly higher than that of the European population of the Union.

The respective origins of the Bushmen and Hottentots are unknown. Both were primitive nomadic peoples; but while the Hottentots had attained to the pastoral stage, and were capable of being trained to industry by association with the European settlers, the Bushmen maintained themselves in caves and thickets, feeding upon roots, berries, and honey, and the flesh of such wild creatures as fell to their bone-tipped poisoned arrows.

The Bantu of South Africa, on the other hand, are virile and prolific. The word itself, *Aba-ntu*, is the plural of *um-ntu*, which means in the dialects of the principal east coast tribes a 'human being'; and its use, as a generic term for the natives of Central and South Africa, is due to the late Dr. Bleek. The actual birthplace of the race has not been determined; but it is known that the more vigorous branches migrated southwards from Central Africa by way of the east coast; and the admixture of Asiatic blood, especially apparent in certain physical and social characteristics of the military tribes of South Africa, is generally supposed to have been the result of intermarriage with the Phoenicians, Arabs, and Indians, who from time immemorial had established settlements upon this coast of Africa.

The determining characteristics of the Bantu are:

- (1) Tribal organization under paramount and lesser chiefs, with a system of communal land-tenure and

Bushmen
and
Hottentots.

Their
character-
istics.

communal or collective responsibility for crime, maintained by a body of customary law. (2) A language inflected mainly by prefixes, and dependent in the construction of sentences upon harmony of sound. Prior to the appearance of European teachers, the Bantu had no knowledge of written signs; oral narratives and folklore being their only development in the direction of literature. (3) A religious sense, founded upon the supposed power of the spirits of the dead to work good or evil to the living, and a belief in witchcraft and other manifestations of the supernatural. (4) A knowledge of agriculture and of some of the useful arts. Horned cattle, their chief possession, form the common measure of wealth and the medium in which tribute to the chief, fines for offences, and the bride-price are paid. They have settled habitations, and use, mainly as a protection against cold, certain primitive articles of dress. (5) The institution of polygamy, and the passing of cattle from the intending husband to the father of the bride, which, with the consent of the latter, constitutes a contract of marriage under Native custom.¹ (6) Among the east coast tribes in particular, a natural instinct for war, with the possession of simple but effective weapons, and a special aptitude for military discipline. Among such tribes, prior to the establishment of European control, the whole life of the adult males was devoted to war and councils of war, and most of the work of cultivating the soil and tending cattle was left to the women.

Political
and eco-
nomic

The Bantu may be distinguished roughly as 'military' and 'industrial'. The main features, which under primi-

¹ 'The contract [Ukulobola] is not one of purchase and sale. The woman does not become her husband's slave. . . . The customs regulating the restoration or retention of "ikazi" or "lobolo" cattle constituted in the heathenish state a salutary check on both husband and wife. . . . If the husband ill-treated his wife beyond all reconciliation, she returned to her father's protection and the husband recovered either a small residuum or, in some cases, none of his cattle, thus losing both wife and dowry. On the other hand, should separation have resulted from the wife's misbehaviour, most of the cattle were returned, the woman lost caste, and her father suffered' (*Report of South African Native Affairs Commission*, 1903-5).

tive conditions differentiated the two groups, are these. ^{distribu-}
 In the military tribes the power of the chief, or 'king', ^{tion.}
 was almost absolute, and the 'town', or principal kraal,
 was laid out with a view to defence; the huts being
 placed in a circle round the chief's hut and the cattle
 pen, and the whole enclosed by a stockade. Among the
 industrial tribes, on the other hand, the power of the
 paramount chief was limited by (1) the council of lesser
 chiefs, and (2) the *pitso*, or general assembly of the tribes-
 men; the town was 'open', since the dwellings, which
 were generally more commodious than the beehive-shaped
 huts of the military tribes, were disposed without regard
 to defence and unprotected by any fence. The military
 tribes, again, had little land under permanent cultivation,
 and confined themselves mainly to the pasturing of cattle;
 while the industrial tribes cultivated permanently the
 fertile lands in the neighbourhood of their 'towns' and
 had attained some skill in the working of metals, the
 weaving of coarse cloth from cotton, and the making of
 pottery.

By reason of their superiority in war the military
 tribes secured possession of the most fertile and well-
 watered regions, and the industrial tribes were, for the
 most part, scattered over the central plateaus, or driven
 for safety into the western deserts. The chief seats of
 the Native population, therefore, are found in close
 proximity to the Drakenberg and its allied ranges (which
 intercept the moisture-laden clouds brought by the
 monsoon winds), and in particular in the regions lying east
 and south-east of these ranges, and between them and
 the sea. Consequently, while the Native population of the
 Cape proper and the Free State Province is comparatively
 small, dense masses of these dark-skinned people are to
 be found in the Transvaal, Natal, and in the Transkeian
 territories running eastward from the old Cape boundary
 to Natal. Taking the 1911 census in conjunction with
 the returns given by the (Union) Native Affairs Depart-
 ment, the distribution of the total Native population of
 the Union (4,060,000) among the four provinces is as

follows: in the Cape proper, 650,000; in the Free State, 340,000; in the Transvaal, 1,220,000; in Natal (with Zululand), 950,000; and in the Transkeian Territories, 900,000.

Economic
distribu-
tion.

Natives in
Reserves
and Na-
tive Terri-
tories.

Passing from political to economic distribution, we find that one half of the four million Natives within the Union are living on lands assigned for their exclusive occupation; nearly one half on private or Crown lands, or on mission reserves; and the remainder, only some 230,000, in townships and municipal areas. Of the three groups thus distinguished, the first and largest consists of Natives living by agriculture, under the modified tribal government of their chiefs, upon tracts of land set aside and reserved to them for communal occupation by the various South African governments now merged in the Union. To this group must be added the population of the three Native Territories of the High Commission; viz. (1) Basutoland, with 400,000 Natives and 1,300 Europeans; the Bechuanaland Protectorate, with 124,000 Natives and 1,700 Europeans; and Swaziland, with 99,000 Natives and 1,100 Europeans. The collective native population of over 600,000, thus obtained, will be incorporated into the Union in the course of time, and it is now to all intents and purposes economically identical with the first of the three groups within the Union. Considerably more than one half, therefore, of the actual and prospective Native population of the Union remain under tribal conditions, and are only slightly associated with the European community. On the land which they thus occupy (with few exceptions) communally, and free from any charge except the hut or poll-tax, they are able to support themselves in comfort by tilling the soil and pasturing cattle; and it is only in exceptionally bad seasons that economic compulsion causes their young men to leave their kraals, in order that they may earn money by selling their labour to the white employer. The periods during which they are willing to remain away from their homes are very brief; the average contract of service being for three to six months on the mines, and for rather longer

in the case of farm labourers. As a general rule they do not thus seek employment after they have reached the age of 40, and the number of adult male tribal Natives between the ages of 15 and 40 under European employment at any given time is estimated to be only one-fourth of the total number of such persons. It is from this group that the mining industry of the Union draws its main supply of British African Native labourers. According to the returns of the 1911 census, there are 342,000 persons of all races, of whom 47,000 are Europeans, engaged in this industry. In the Transvaal Province it is necessary to supplement the supply of British African labour, thus obtained, by the importation of Native labourers, under contract for a year's service on the mines, from Portuguese East Africa. Of the 300,000 Native labourers employed in the Proclaimed Labour Districts of this province, one-third are drawn from Portuguese territory; while of the 200,000 out of this total who are at work on the mines, no less than one-half are thus imported.

The second group of approximately 1,750,000 Natives live mainly on the privately owned lands of Europeans, and provide much of the labour required by the Dutch and British farmers for agriculture, stock-raising, and fruit-growing. The terms upon which they, and their families, are permitted thus to occupy these lands vary from a regular tenancy, with the payment of a rent in money, to a contract of employment for wages as hired labourers. But the majority of the Natives comprised in this group are 'labour tenants', or Native 'squatters'. The former class, in return for the use of the land which they occupy and cultivate for their own benefit, give the European owner (and farmer) some two or three months' labour, as required by him in the course of the year. The latter are found on Crown lands, on private lands, and especially on the large areas of undeveloped land held by land companies; and the Native squatter is generally allowed to cultivate as much land as he can in consideration of rendering a half-share (or such other proportion as may be agreed) of the produce to the European proprietor. The Natives of

Natives
living on
Crown and
private
lands.

this group hold a definite place in the economic system of the European community, as supplying labour for agriculture; but the conditions under which the majority of them live, though no longer tribal, are still very primitive.

Urban
Natives,
Coloured
people,
and Asia-
tics.

The third, and by far the smallest, of the three groups consists of the 230,000 Natives, who, together with the coloured population, provide the bulk of the manual labour required by the Europeans in the towns other than that which is employed in the mining industry. It is the element of the Native population which is most closely identified with the white inhabitants, since it comprises the Natives who are, comparatively speaking, in regular European employment, including domestic service, and living continuously under conditions which compel them in varying degrees of completeness to adopt the dress, and conform to the mode of life, of Europeans. It is in connexion with this group that the 'Coloured' and Asiatic population of the Union must be placed. The number of persons returned under the head of 'All other Coloured races'¹ in the census of 1911 is (in round numbers) 625,000. Of this total some 150,000 are Asiatics, and 475,000 mixed African, and African and European peoples.² The majority of these latter, the 'Coloured people' of South Africa, as distinguished from the immigrant Asiatics, are to be found in the Cape Province, where they provide a body of skilled and unskilled labourers considerably more advanced in civilization than the small section of the Natives who are regularly employed in the towns, but otherwise holding much the same economic position as such Natives. Of the Asiatics, the British Indians of Natal and the Transvaal are, with few exceptions, small traders or coolies employed in the sugar and tea plantations³; the Malays

¹ The term 'Coloured' is a misnomer in so far as it includes such Hindus as belong to a white stock.

² e. g. the Griquas are 'of mixed Hottentot and (African) slave descent, with an infusion of European blood' (*Native Affairs Commission* of 1903-5).

³ [The presence of this Indian population has constituted a problem within the larger Native problem. Indians were admitted into Natal under indentures in 1860, and were allowed to settle after expiry of their con-

of the Cape Peninsula are practically a working-class population; and the few Chinese in the Cape are labourers.

The foregoing accounts enable us to form a general conception of the relationship of the European community to the aboriginal inhabitants. Broadly speaking, more than half the Natives have as yet no social or economic connexion with the Europeans except such as is afforded by the intermittent engagement of their adult males as manual labourers in the industries of the Union, and by the presence among them of European magistrates, missionaries, and traders. Of the almost equal number living on the land of Europeans the majority are untouched by European civilization; and only a small proportion, possibly one-fourth, of the Natives as a whole are associated with Europeans in industrial relationships to an extent sufficient to cause their habits and mode of life to approximate, in varying degrees, to those of the European community. Apart from the effects produced by this partial admission to a partnership in industry, the main agencies directly employed for the purpose of raising the Natives (and Coloured people) in the scale of civilization are these: (1) Religious and secular education. (2) The gradual substitution in the administration of justice of European principles of law (with individual responsibility for crime) for the tribal discipline of the chiefs, communal responsibility, and Native customary law, and of individual for communal tenure of land. (3) A training in citizenship provided by the introduction

Present
condition
of Native
popula-
tion.

tracts; the consequences of this were not seriously recognized until some three decades later. Then their activity and competition with the whites in trade became seriously felt, and a series of restrictive measures, such as the imposition of a poll-tax upon non-indentured Indians, were enacted, aiming later at the restriction of the activities of settlers and at the limitation of immigration, though behind all this there remained among white planters a sense of dependence on Indian labour. The application of the various laws has caused serious friction from time to time, which has provoked strong feeling in India itself; moreover, it has spread in South Africa beyond the confines of Natal, as when by way of restricting it to that province Asiatic immigration into the Transvaal was prohibited and the registration of Indians already settled there was undertaken (in 1907) by means of finger-prints. The question of the status and treatment of Indians again became acute in 1913.]

of local self-government, and admission to the parliamentary franchise.

Education. In considering these agencies and the results which are being obtained from them, it must be remembered how small is the European community and how recently European control has been established. The first agency, indeed, is due mainly to religious and philanthropic enterprise, the sources of which are to be found in Britain and other parts of Europe, and not in South Africa. The operation of the various Christian missions, dating from the establishment of a station by the Moravian Brethren near Swellendam, prior to the first British occupation of the Cape (1795), has been recognized as a powerful factor in the civilization of the Natives by the greatest British administrators; and the missions, in respect of their educational work, have acquired to-day the financial support and general co-operation of the Union and Protectorate Governments, with the result that the main work of Native education is carried on under a system of State-aided mission schools. The institutions thus maintained by the joint efforts of the Churches and the State comprise (1) Elementary Schools, (2) Training Colleges for teachers, and (3) Trade and Industrial Schools for both sexes. A measure of the extent to which the Native population as a whole is served by this system is afforded by the fact that, while some 15 to 20 per cent. of the Europeans are under instruction, the percentages of the Natives (excluding Coloured people and Asiatics) under instruction are approximately 5 in the Cape, 3 in the Free State, 1.5 in Natal, and 1.2 in the Transvaal. The great mass of the Natives, therefore, remain outside the scope of the existing machinery of education; but the results obtained within the limited field of its operation are none the less sufficiently definite to justify the gradual extension of the assistance given by the State, and the education authorities of the Union have adopted the policy of developing the mission system on its practical side by giving special encouragement to trade and industrial schools, and by promoting instruction in the elementary rules of hygiene.

At the same time the value of the religious teaching which is a characteristic feature of the mission system is fully recognized, and it is required that regular moral and religious instruction should be given in all Native schools, whether government or mission. It is in the Cape Province that Native education has been longest in operation and has produced the most striking results. Here, in addition to the Natives properly so called, a large number of Coloured children have attended the schools, and of the non-European population of this province as a whole some 5 per cent. are under instruction. For many years past such educated Natives and Coloured persons have been employed as carriers of letters and telegrams, clerks, interpreters, and school-teachers, &c.; and have competed with Europeans as carpenters, blacksmiths, wagon-makers, shoemakers, printers, saddlers, &c. Indeed, skilled Coloured labour has become so important, industrially and politically, in the Cape Province, that whereas in the Transvaal the white Trades Unions endeavour to exclude it, here they invite it to co-operate with them. Further evidence of the progress of Native education is furnished by the fact that the Natives themselves are beginning spontaneously to claim its advantages. It is proposed to meet this demand in two ways: (1) by recognizing and assisting schools established by Natives independently of the missions, where such schools are adequately supported by local Native contributions or rates and satisfy the requirements of the Education Departments; and (2) by the establishment of a Union Native College sufficiently equipped to enable Natives and Coloured men of exceptional gifts to obtain University degrees and qualify for professional careers. In this connexion the existence of the Native press must be mentioned, as being in itself a proof of educational progress. Although it is as yet in a rudimentary stage, it performs a useful service in spreading a knowledge of current events among its readers, and through them among the illiterate masses. Thus to widen the range of information, and stimulate the intelligence, of the Native population is its main

achievement. As the chiefs and other responsible leaders are too primitive to convey their thoughts through the medium of print, the Native papers cannot be considered representative of Native opinion as a whole; at the same time the grievances and crude aspirations to which they give expression merit attention as indications of the working of the Native mind.

Religion. According to the census of 1911, one-third of the total non-European population of the Union are members of a Christian Church. The Wesleyans have the largest (non-European) membership (456,017); the Anglican Church stands second (276,849); the Dutch Churches third (204,702); the Lutherans fourth (195,308); the Congregationalists fifth (173,982); the Presbyterians sixth (72,114); and the Roman Catholics last (37,242). The African Methodist Episcopal Church, which is the product of the Ethiopian, or Church Separatist movement,¹ has 59,103 members. Allowing for the greater prevalence of Christianity among the Coloured as against the Native population, it may be assumed that at least one-fourth of the Natives of the Union are Christianized. Apart from the professing Christians, there are to be found among the non-European population 115,701 Hindus, 45,842 Muhammadans, and 1,783 Buddhists and Confucians. The number of non-European people returned as being of no religion is 3,012,648. It would be superfluous to dwell upon the general utility of the spiritual work of the missionary organizations, since it is recognized on all hands as a powerful factor in civilization, but the relation of Christian teaching to polygamy may be noticed. This institution had a natural justification so long as the constant occurrence of tribal wars produced a marked preponderance of females over males. To-day, however, with the complete suppression of such tribal strife by European control, this preponderance has been removed, and while some 20 per cent. of the married Natives remain poly-

¹ The origin of this movement is to be found in the desire of a section of the Native Christians to emancipate themselves from the authority of the European Churches. It is, in part at least, a political or 'Natives' rights' movement.

gamists, the number is decreasing. Apart from the main cause, the fact that there is now only a slight excess of females over males, the decline is assisted by economic pressure, consequent upon the introduction of European commodities and a higher standard of domestic comfort, which makes it increasingly difficult for a Native to obtain the *lobolo* (bride-price) cattle and provide in other respects for more than one wife and her offspring. Thus a great obstacle to the spread of Christianity among the Native population is being slowly but surely removed.

The general operation of the agencies for civilization grouped under (2) and (3) has been described in preceding paragraphs, and it is only necessary to add to that account information upon one or two particulars. The substitution of individual for tribal tenure of land was a feature in Sir George Grey's Kafir policy (1854-62), and thirty years later it became one of the main objects which Rhodes sought to achieve by the Glen Grey Act (1894). Under this enactment of the legislature of the (then) Cape Colony, provision was made for dividing the district of Glen Grey, hitherto a 'reserve' in communal occupation, into 'locations', and for subdividing the arable land of these locations into allotments of four *morgen* (rather more than eight acres) to be held, with their respective rights of commonage, in perpetual quit-rent tenure by individual Natives. The succession to the allotment was regulated by the provisions of §§ 24 and 25: 'The allotment and other immovable property of every registered holder shall not be capable of being devised by will, but upon his or her decease shall devolve upon and be claimable according to the rule of primogeniture by one male person to be called the heir,' and determined by the table of succession set out in § 24.

Elsewhere in the Act provision was made for the introduction of a simple system of local self-government consisting of (nominated) Location Boards and (partly elective) District Councils.¹

¹ *South Africa ; a Study, &c.* (by the writer), 1895. Notes on 'Sir George Grey's Kafir Policy' and 'The Glen Grey Act, August, 1894'.

Extension
of Glen
Grey Act.

In 1898 the principles of the Glen Grey Act, as modified by experience, were introduced in the Transkei,¹ and here in 1910 the system was in operation in seventeen out of the twenty-six districts to which the Act applied, and 1,400 individual titles to land had been secured. In this larger field it is found that individual land tenure has given general satisfaction, and that there is a growing disposition on the part of the Natives to favour its extension to other districts. Local self-government has been applied also with considerable success in the Transkeian Territories and in Pondoland. In 1910 the population represented in the General Council of the latter country numbered 80,000, while the Transkeian General Council was representative of 600,000 persons and had a local taxation revenue of £62,264. The composition of the General Council is partly elective, but its powers are purely deliberative, and all executive decisions are made by the (European) magistrates, who are *ex-officio* members. The substitution of individual for communal land tenure is not merely important as tending to lessen the interval between the respective modes of life of the Native and European communities, but it also promises to improve the economic position of the great mass of the former. Owing to the withdrawal of the checks formerly exercised upon the growth of population by tribal warfare, famines, and epidemics, the Natives are now increasing rapidly, and it has become more and more difficult for them to support themselves upon the land reserved for their sole occupation. The Native methods of agriculture must remain primitive for many years to come, but it is believed that the introduction of individual tenure will increase materially the general productiveness of the Native Territories and Reserves.

Acquisition
of land by
Natives
and
Coloured

With this question of the substitution of individual for communal land tenure is associated the second and more contentious question—whether or not Natives should be allowed to acquire land outside the areas assigned for

¹ See following chapter (VIII).

their exclusive use and occupation. In the Transvaal and Free State, under the old Republican government, Natives or Coloured persons were debarred from possessing land. At the present time (under a decision of the Transvaal Courts) Natives are entitled legally to possess land in the Transvaal, but they are forbidden by law to acquire by purchase, or lease, land in the Free State Province. In the other two provinces no distinction in this respect is made between Natives or Coloured people and Europeans. The establishment of Natives or Coloured persons, individually or collectively, as landowners and householders in areas exclusively occupied by Europeans would be attended in certain cases by such grave practical inconvenience¹ that legislation consolidating the laws of the several provinces, and materially restricting the rights in this respect possessed by Natives and Coloured people in the provinces other than the Free State, may be expected from the Union Parliament. The broad justification for such a course lies in the consideration that, as Europeans are excluded rigorously from acquiring land in the areas reserved for the Native population, it is only reasonable that a similar disability should be imposed upon the Natives themselves in respect of areas occupied, or to be occupied, by the European community. If, however, as seems probable, Natives and Coloured people in the mass should be thus excluded from possessing land outside the Reserves, some provision will be made, no doubt, for putting the educated Native or Coloured person—the man who is European in all but colour—upon an equality in this, as in other respects, with Europeans.²

people in
European
areas.

A strong difference of opinion exists on the question of the extension of the franchise to Natives and Coloured persons. As a measure of the actual degree of progress in this matter so far attained, the return of the registered parliamentary voters in the Cape, by whom collectively the

The
Coloured
vote.

¹ Or danger: e.g. the outbreak of bubonic plague in Johannesburg in 1904, prior to the removal of British Indians and Natives from the town.

² [In this connexion reference should be made to the following chapter (VIII), where the Act of 1913 of the Union Parliament dealing with land purchase, &c., is outlined.]

fifty-one Union Members of Parliament for this province were elected in 1910, may be added. Of the total electorate of 142,367, the European voters numbered 121,346 and the 'Other than European' 21,021. The latter number, constituting the 'Coloured vote' of the Union, was composed of 6,633 Kaffirs and Fingos, 715 Hottentots, 911 Malays, 764 Indians, 20 Chinese, and 11,978 persons of other mixed and Coloured races.

The Europeans

Origins,
The Dutch.

The original stock of the Boer or Dutch Afrikaner people contained a considerable admixture of French blood. The foundation of the predominant white population of the Union was laid almost exclusively between the years 1652 and 1690, and during the last decade of this period the Dutch East India Company made active endeavours to increase the population of their recently established settlement at the Cape of Good Hope. The census of 1687 returned a European population of 573, exclusive of the officials and servants of the Company. In 1691 the number of permanent settlers of all ages and both sexes had risen to (in round numbers) 1,000. Since the Company made no further efforts to introduce fresh colonists after this date, we have in this 1,000 persons the progenitors of the Dutch Afrikaners of to-day. The immigration lists and other official records show that the main elements of which this parent stock was composed were as follows: (1) The discharged soldiers, sailors, and other servants of the Company who formed the original settlement in the Cape Peninsula, and were planted on 26-acre plots at Rondebosch in 1657, and subsequent settlers of the same class. (2) Parties of young women from the public orphanages of Holland, who were sent out by the Company in 1685 and the immediately succeeding years, in order that the unmarried settlers might be provided with wives. (3) A community of Huguenot refugees of whom at least 150 remained in the Colony (1688-90). And (4) an approximately equal number of mainly Dutch families, sent out

from Holland concurrently with the French. The first and last of these elements were not entirely Dutch, and the population of 1691 was racially two-thirds Dutch, one-sixth French, one-seventh Low German, with a few Swedes, Danes, and Belgians. The Low German element was almost identical with the Dutch, but the French settlers, apart from the complete difference of race, were of a relatively higher social grade, and exercised an appreciable influence upon the life and character of the Afrikaner community. Drastic measures were taken from the first by the Company to prevent the Huguenots from maintaining themselves as a separate nationality, and by the middle of the eighteenth century the French language was forgotten and the refugees themselves had been completely incorporated into the Dutch majority. In the compulsory abandonment of French and the hurried acquisition of Dutch, Olive Schreiner (Mrs. Cronwright Schreiner) has found the origin of the clipped and broken Dutch *patois* known as the *Taal*. For the French, having learnt Dutch imperfectly, and from illiterate sources, communicated to the rest of the white community the mutilated dialect which for two centuries has been the national tongue of the South African Dutch. The barrier of the *Taal* and the illiberal and monopolist system of the Dutch East India Company, under which all external trade was carried on by the officials of the Company,¹ together cut off the settlers almost completely from social and intellectual intercourse with Europe, and at the close of the Company's régime, when Britain temporarily occupied the Cape Colony (1795), the white inhabitants formed to all intents and purposes a seventeenth century community. 'In the common life of the European peoples,' says the same writer, 'the Boer has had, and could have, no part. Behind him, like a bar, two hundred years ago the *Taal* rose, higher and higher, and land-locked him in his own tiny lagoon.'²

¹ 'In all things political, purely despotic; in all things commercial purely monopolist' (the late Judge Watermeyer).

² Olive Schreiner, in the *Fortnightly Review*, 1896.

The
British.

In 1806, when British rule began, the Cape Colony had a total population of 73,633 persons, of whom 26,720 were whites, 17,657 Hottentots, and 29,256 (mainly African) slaves. Up to the formal cession of the Colony to Britain in 1814, the British inhabitants consisted of officials, soldiers, merchants, and missionaries. Six years later, however, some 5,000 British emigrants were brought out by the government and settled in the east of the (then) Colony, and owing to these settlers and their descendants, and to the withdrawal of a large section of the Dutch farmers from this part of the Colony in the Great Trek (1835-8), the Eastern Province of the Cape Colony became predominantly English-speaking, in contrast to the Western Province, which, with the exception of Cape Town, remained almost exclusively Dutch. Under this, the Albany Settlement, as it was called, an appreciable British population was introduced for the first time into South Africa. Considerable bodies of British immigrants were brought into the Cape Colony, wholly or in part by the government, at two subsequent periods—over 4,000 in 1846-51, and some thousands again in 1858-62. As regards the other three provinces of the Union, British immigrants to the number of 4,500 were introduced into Natal in 1849-51, and this 'Byrne' immigration,¹ in conjunction with the return of a large proportion of the 'Emigrant Farmers' (Boers) to the west of the Drakensberg upon the establishment of British authority, has caused the European population of this province to be predominantly English-speaking. During the reconstruction of the Transvaal and the Orange Free State after the war, some 2,000 British agricultural settlers were established side by side with the Boer farmers, and employment was found for 3,500 young women, mainly domestic servants, who were brought out from Britain by the joint efforts of the government and private organizations. With the exception of these state, or state-aided, immigrations and the natural increment arising from them, the British population of the Union is due almost

¹ So called from its chief promoter.

entirely to immigration consequent upon the discovery of diamonds at Kimberley (1871) and of gold on the Witwatersrand (1886), and the general industrial and commercial development which has followed the active exploitation of the mineral wealth of South Africa from 1870 onwards.

South Africa has attracted an appreciable number of Other emigrants from Central and Eastern Europe and a European sprinkling of Italians. Such immigrants are to be found popula- chiefly in the mining areas or in the neighbourhood of tion. other large towns. Apart from this miscellaneous foreign population, considerable bodies of German settlers were established in the Cape Colony during the governorship of Sir George Grey (1854-62). In 1857 over 2,000 men of the Anglo-German Legion were settled in British Kaffraria to strengthen the (then) frontier against Kaffir aggression. This measure was followed by the introduction of 2,300 German agricultural immigrants into the same territory in 1858-9; and in the following year a further and considerable number of this class of German immigrants were introduced into the Colony itself. In the last years of the South African Republic, and especially during, and after, the construction of the Netherlands South African Railway from Pretoria to Delagoa Bay, officials and employés, with other professional and semi-professional persons, were brought over from Holland by the Boer government. The majority of these 'imported Hollanders', including almost all of the officials and employés of the Netherlands Railway Company, left the country during the war; but a certain number have remained in the Transvaal and the Free State Provinces.

Of the total European population of the Union Political (1,276,000) in 1911, the Cape Province has (in round distribu- numbers) 582,000; the Transvaal, 420,000; the Free State, 175,000; and Natal, 98,000. A comparison of these returns with those of the preceding census of 1904 shows that in the several provinces the respective rates of increase per 100 during the intervening seven years, are: in the Cape, 0.59; in the Transvaal, 41.56; in the Free

State, 22.96; and in Natal, 1.52. As the result of the relatively rapid growth of the European population of the Transvaal, this province is entitled under the system of automatic redistribution of seats established by the South Africa Act, 1909, to send nine additional members (45 instead of 36) to the next Union House of Assembly.¹

Economic
distribution².

Passing from political to economic distribution, under the census of 1911 the European population is divided in respect of 'occupations' as follows: Professional, 59,721; Domestic, 290,560; Commercial, 81,627; Agricultural, 192,424; Industrial, 143,255; Indefinite, 10,745; Dependants, 492,959; Unspecified, 4,951. And in addition to this it may be noted that 26,258 persons, of whom 294 are women, are employed in the various branches of the Public Service; while of the nearly 350,000 persons of all races absorbed by the mines, 47,000 are Europeans. The main economic division into countrymen and townsmen—the former gaining a livelihood by agriculture and stock-raising, viticulture, and fruit-growing, and the latter by commerce, mining, and the lesser industries, still runs closely on racial lines. The Dutch remain for the most part on the land; the British congregate in the towns and industrial centres. At the same time, owing to the stimulus given to South African agriculture in the period of reconstruction (1902–7), the proportion of British people engaged in the cultivation of the soil is larger than it was before the war; while, on the other hand, with the control of the administration in the hands of the Dutch majority, an increasing number of Dutch Afrikaners are being employed as government officials and adopting professional careers.

Religion². As in the other oversea English-speaking communities, so in South Africa religious organizations are maintained, with slight exceptions, by the voluntary contributions of their respective members. The Dutch Churches (the

¹ The representation of the other provinces is not altered, since a larger number of seats were assigned originally to the two lesser colonies, the Free State and Natal, than they were entitled to have on a strict numerical basis.

² For tables relating to the total population, see pp. 518, 519.

Dutch Reformed Church and the Z.A. Gereformeerde Kirk) have the largest European membership—a membership which, according to the census of 1911, amounts to nearly 700,000 persons, and thus constitutes a clear majority of the white population of the Union. The Anglican Church is next in point of numbers with 255,000 members. These communions are followed at a considerable interval by the Wesleyans (80,000), the Presbyterians (58,000), the Baptists (15,000), and the Congregationalists (13,000). The Roman Catholic Church numbers 53,000 adherents; and there are 22,000 Lutherans, 46,000 Jews, and 35,000 persons of no specified religion.

In respect of education, on the other hand, the State Education. has assumed a full measure of responsibility. Apart from the institutions which it directly maintains, the government exercises a general supervision over all private schools. Under the Union Constitution (1909) the duty of providing for 'education other than higher education' is vested in the several Provincial Administrations 'for a period of five years and thereafter until Parliament otherwise provides', while 'higher education' is reserved for the Union Government. For the present it has been agreed by the education authorities of the Union, that 'higher education' is to be taken to mean 'education Higher. beyond the standard of matriculation'; but that (1) the Training Schools for (Elementary) Teachers should be left under the control of the respective Education Departments of the four provinces, and (2) Agricultural Higher Education should remain under the (Union) Department of Agriculture. As the result of this arrangement the Minister of Education for the Union is concerned directly with the University of the Cape of Good Hope, the seven University Colleges established throughout the four provinces, and the South African School of Mines and Technology at Johannesburg. The existing University, being only an examining and degree-conferring body, has no resident students; but the eight teaching institutions have a collective enrolment of some 1,200 students. Apart from bringing the various provincial systems into

uniformity and exercising a general supervision of the whole field of education within the Union, the first Minister of Education is engaged in 'the establishment of a University of South Africa to meet adequately the demands of the times'. A large instalment of the funds necessary for the creation of this long-desired teaching and residential University has been provided (conditionally) by private munificence; but the unhappy controversy as to the degree in which the bi-lingual principle embodied in the Union Constitution is to be applied to the teaching system of the new University, has prevented the Minister of Education, up to the time of writing, from obtaining the powers necessary for the execution of the project from the Legislature.

Agricultural, &c.

A generous provision is made for practical instruction in agriculture and the allied industries, and some fifteen institutions, ranging from the Transvaal College of Agriculture at Pretoria to experiment stations and stud farms, are maintained by government for this purpose. These institutions are distributed among the four provinces and are administered by the (Union) Department of Agriculture. Provision is made also in one or other of the higher education institutions for special training in medicine, civil and chemical engineering, mining, teaching, and other professional pursuits. It may be added that no less than five Rhodes Scholars are elected annually from within the Union.¹

Primary.

The machinery of primary education (as above defined) is provided in each province by an Education Department and local education authorities, consisting of School Boards, or Committees, and District Education Boards. The Departments, which are controlled by the Directors of Education for the several provinces and have adequate staffs of inspectors, are practically identical in organization; but the character of the instruction given in the schools, the nature and powers of the local education authorities, and the proportion of the total cost con-

¹ Rhodesia, 'as founder's kin,' has three scholarships; making eight for South Africa as a whole.

tributed by the localities, vary considerably in the several provinces. An endeavour is being made, however, by the Union Ministry of Education to introduce gradually uniformity in all such matters. Under the constitution of the Union as embodied in the South Africa Act, 1909, English and Dutch are both declared to be official languages and otherwise placed on an equal footing. This circumstance complicates the working of the machinery of administration as a whole, but the difficulties inherent in it are felt nowhere so directly as in education. Primary education especially has suffered; but it is satisfactory to know from the Union Education Reports that an endeavour is being made to 'formulate a common procedure in the respective use of Dutch and English as media of instruction, which will be acceptable to the education authorities in all four provinces.'¹

A fairly generous measure of recognition and financial support is given by the state to associations and institutions founded for the promotion of scientific research, art, and literature. The Royal Society of South Africa receives (1912) an annual grant of £250, and art galleries, museums and public libraries are aided similarly by grants varying from £1,300 to £15. The chief libraries are the South African Library at Cape Town and the public libraries at Johannesburg and Pretoria. In both the Transvaal and the Cape public libraries are established in the lesser towns, and there were in 1912 in the latter province some 160 of these useful institutions. But such progress as has been made in the artistic and intellectual equipment of the South African people is due, in the main, to private enterprise and munificence. To this source Johannesburg owes the collection of modern pictures of artistic value which are to be seen in its Art Gallery—and in effect the gallery itself; and the fine collection of Dutch and other masters with which Cape Town is enriched, was presented only recently to the people of the Union. The South African Library was furnished by Sir George Grey's MSS. and

Science
and art.

¹ *The Union of South Africa* (by the writer), London, 1912, p. 459.

rare books, and the special scientific needs of Johannesburg have been supplied by the gift of the Seymour Memorial Library.

Architec-
ture.

In architecture, where an appreciable advance has been made in the evolution of a South African style, the impetus came from an individual. Not only did Rhodes appreciate himself the quiet beauty of the seventeenth and eighteenth century homesteads in the Cape Peninsula and the adjoining mainland, but he introduced to South Africa the gifted architect, Mr. Herbert Baker, who has adapted this Afrikander model to modern requirements. Nor was Rhodes's influence confined to domestic architecture. He realized that in contour, atmosphere, and colouring South Africa was a larger Greece, and that therefore the forms and motives of classical architecture could be employed with special propriety in the designing of public buildings in South Africa. The two monuments of the first rank for which he was directly responsible, the Alan Wilson and the Kimberley siege memorials, are wholly Greek. The example has been followed in the stately memorial on the slopes of Table Mountain which bears his name, and the vast and imposing fabric of the new Union Buildings at Pretoria.

Literature.

In literature also the European community of South Africa can claim to have developed on original lines. In the scenes and thoughts supplied by the conflict between European civilization and native life and character a group of civil servants and native commissioners have formed subjects for some volumes of graceful verse; and a stormy and eventful past, together with the presence of the native population, has stimulated not a few writers to patient and laborious researches in the field of history and ethnology. It is, however, in the representation of the physical conditions of the country and the characteristic lives of its people through the medium of prose fiction that the most distinctive merit has been attained. The moods of nature, the strange life of the isolated Boer homestead, the trekking, hunting, and fighting of the pioneers, the discoveries of diamonds and gold, all alike

afford material for creative literature. Such material has been used with conspicuous success by Olive Schreiner in *The Story of an African Farm*, and by Sir Percy Fitzpatrick in *Jock of the Bushveld*.

Problems special to the Union of South Africa

The foregoing account of the peoples of the Union would be incomplete without some reference to the special problems by which this young state is confronted. The first and most important is the fusion of the two predominant European nationalities, the Dutch and British. In most respects the problem has been simplified materially by the union of the four colonies under the Crown, achieved by the National Convention of 1908-9; but in one aspect—the language question—it has been rendered more difficult of solution by this event. The main conditions which stand in the way of racial amalgamation are (1) the difference of character and pursuits which tends to keep the two nationalities apart, the British in the towns and the Dutch in the country districts; and (2) the use of separate languages. The first of these adverse conditions has been modified appreciably by the extension and improvement of railways and other means of communication and transport, and the development of the agricultural resources of the new colonies in particular and of South Africa as a whole, effected during the years immediately succeeding the peace of Vereeniging; and the continued operation of these agencies is secured by the provisions for the administration of the railways as a non-political and purely economic system contained in the constitution, and by the large measure of assistance and direction which the Union Government renders to agriculture in all its branches. The encouragement of European immigration by state aid, which would supplement usefully this development of the agricultural resources of the country, may also be expected so soon as such ‘new-comers’ can be introduced without detriment to

The fusion of the Dutch and British.

the material interests of the existing population. As it is, since the peace the number of British, resident and immigrant, able to find lucrative and congenial employment in agriculture and the allied industries has been appreciably increased. Concurrently, since the end of the war, the standard of education in the country districts of the Transvaal and Free State Provinces has been greatly advanced, and with these improved opportunities for acquiring a training in industrial and commercial pursuits a larger proportion of the Dutch population may be expected to seek employment in the towns. By the combined action of these two agencies—agricultural development and education—definite progress towards the ultimate fusion of the two nationalities may be achieved. An increasing proportion of the British will be associated by an identity of pursuits and interests with the main body of the Dutch on the land; and an increasing proportion of the Dutch will be associated similarly with the main body of the British in the towns.

Dual
official
language.

The second adverse condition, for the moment at all events, has been aggravated by the attainment of administrative unity, since under the Union Constitution the English and Dutch languages are put on a complete equality. Not only does the South Africa Act declare them to be official languages of the Union, but it specifically directs that all records of Parliament and the Law Courts are to be kept, and all public notices issued, in each of the two languages. The insistence upon the strict interpretation of these provisions, to the extent of compulsory bi-lingualism in education,¹ has produced a grave recrudescence of the racialism directly arising out of the passionate attachment of the less advanced section of the Dutch Afrikaners to their national language. The hope of solution is to be found in the belief that a sense of responsibility will cause the leaders of the Dutch majority

¹ i. e. making Dutch the medium of instruction for one half, and English the medium of instruction for the other half, of the 'principal subjects' taught in one and the same school.

to hold the balance even, and in the expectation that, if this is done, the question will be decided on economic, and not on political, grounds.

The second problem is that of the supply of labour. The special labour conditions which obtain in South Africa are well known. Europeans only undertake manual labour under pressure of exceptional need. Native African labour never in the past has sufficed for the industrial requirements of the European population. Nor does it suffice to-day, although recent circumstances have tended to favour an increase in the available supply. The employment of Chinese on the Rand terminated in 1910, and the further importation of Indian coolies for the sugar plantations and tea gardens of Natal has been forbidden by law. The favouring circumstances are (1) the cessation of the abnormal demand for labour created by (a) the wastage of war, and (b) the provision of the new material equipment required to meet the industrial expansion consequent upon the establishment of British rule over South Africa as a whole; and (2) the rapid growth of the native population during the seven years 1904 to 1911—a growth so marked that for the first time the natives are shown by the census returns to be increasing at a higher rate by natural increment than are the Europeans by natural increment and immigration combined. Notwithstanding these circumstances, the most important industry in the Union, the gold industry of the Rand, is compelled to import from Mozambique approximately one-half of its supply of African labour.¹ The economic dependence of the Union upon Portugal is a grave disadvantage, which was aggravated by the decision to repatriate the Chinese. The right to recruit labour within Portuguese territory is secured by the Transvaal-Mozambique agreement² for a period of ten

¹ At December 31, 1910, out of a total of 179,083 natives employed on the Rand gold mines, 93,069, or 51.96 per cent., came from Mozambique.

² The acceptance of the agreement, although its provisions for the distribution of the Rand traffic as between Delagoa Bay and the British ports were disadvantageous to the coastal colonies—especially to Natal—was forced upon the National Convention by the circumstance that, as

years from 1909 ; but the Portuguese authorities, both at Lisbon and Lorenzo Marques, have manifested dissatisfaction at the continued withdrawal of African labour, which may be wanted for the development of their own territories, and it is possible that the recruiting of Natives for the Rand mines will not be permitted after the expiry of the agreement.

Measures
towards
ensuring
home
labour-
supply.

To render the Union self-sufficing in respect of its labour-supply is, therefore, a question of the highest economic moment. The required result can be obtained by (1) employing European unskilled labour; (2) increasing the African labour available in the Union and the Native Protectorates; (3) increasing the efficiency of African labour; and (4) reducing the labour requirements of the mining and other industries by the further use of mechanical appliances. Of these methods of solving the labour problem, the first is ideally the most desirable; but to raise the European population of the Union to the level necessary to break through the social convention which forbids the European from undertaking manual labour in South Africa, although ultimately it may become possible, is at present too remote a contingency to be taken into consideration. The last is unlikely to prove effective, in view of the large extent to which labour-saving appliances are employed already in the mining industry. The most hopeful line of advance is to be found in a combination of the second and third methods. An increase of the number of Natives available for employment as unskilled labourers may be expected as the joint result of natural increment and economic pressure—the latter consisting in part in the greater difficulty of making a livelihood by primitive agriculture in the congested and limited areas reserved for exclusive Native occupation, and in part in the greater need of earning money wherewith to purchase the commodities introduced by European civilization. The efficiency of

General Botha said, since the Chinese were being repatriated, the Mozambique labour supply was indispensable to the Transvaal, and to South Africa as a whole.

the Native labourer can be increased in two ways: by (1) lengthening the duration of his periods of service, and (2) raising his capacity. There is good reason to believe, therefore, that the efforts being made to fit the Native for a partnership in industry with the European will be assisted by the operation of natural forces; and that at no very remote period in the future the Native and Coloured population will be able at last to satisfy the labour requirements of the European community.

At this point the problem of the labour-supply merges into the third problem—the incorporation of the Native population into the European system. In the writer's opinion the mental interval which separates the average Native or Coloured person from the average European is too great to admit of this population being assimilated as can be done in the case of the European immigrants; and the Native or Coloured person, apart from exceptional instances, cannot claim, therefore, a political or social status identical with that of the European. It does not follow, however, that those Natives who have adopted a European mode of life, and become associated in industry with Europeans, should not have any political or social status at all. The problem, therefore, resolves itself into the determination of a status for the 'Europeanized' section of the Native African population, which, while not admitting Natives to equality with Europeans, will give them an effective voice in the administration of matters directly concerning them, and provide an incentive to the un-Europeanized majority to struggle for Europeanization. The task of thus incorporating the Native African peoples is undoubtedly one of great difficulty; but there is no reason to suppose it will baffle the statesmanship of the Union. On the contrary, the record of the past is wholly encouraging. A hundred years ago the whole of this vast dark-skinned population was in a condition of complete and dangerous barbarism. Even fifty years ago only a small fragment had been brought under European control. Gradually, and at great cost of life, effort, and money, the entire area of Native occupation

The incorporation of the Native population.

has been covered with a network of European magistracies, and to-day an almost unbroken peace is maintained.

Methods
of incor-
poration.

The present condition of the Natives, the civilizing agencies at work among them, and their main relationships to the Europeans have been outlined in the foregoing pages. Taking the non-European population of the Union and the Native Territories to number approximately 5,000,000, we have seen that of the people comprised in this total (1) one-half are living under (modified) Native conditions on lands reserved for their sole occupation; (2) seven-twentieths under partly Native and partly European conditions on lands within the area of European occupation; and (3) three-twentieths under (modified) European conditions and in close industrial association with European communities. Of these three classes a portion of the second and a majority of the third have reached a stage of civilization which admits of their being incorporated into the system of the Union by the grant of a definite political and social status. When once a status for non-Europeans applicable to all four provinces has been determined, the process of incorporation already begun in the Cape Province can go forward, subject only to the condition that no greater number of less civilized Natives are admitted at any one time than can be absorbed without risk of decivilizing the elements of this population previously incorporated. This condition must be observed; for experience—and for practical purposes this means the experience of the Native Affairs Department of the (former) Cape Colony—has shown that a permanent change of habits cannot be expected, unless there is both an efficient machinery for teaching the young, and an environment of civilization sufficient to prevent the Europeanized Native from falling back into barbarism. The necessity of observing this condition is recognized in the Native policy of the Union, the aim of which is, while generally keeping the Natives apart from the Europeans, to introduce into the locations, or Native quarters, a European standard of life. In pursuance of this aim, it is proposed to break up the large aggregations

of Native squatters in the country districts; since such aggregations tend to perpetuate a low standard of civilization among the Natives living within the area of European occupation. And in the towns and industrial centres it is desired to enlarge the Native quarters, and generally improve the housing accommodation, sanitary arrangements, and facilities for education at present available for Natives and Coloured persons engaged in more or less continuous employment, in order that an increasingly large proportion of the periodic Native workers may settle down, with their wives and families, to permanent industrial occupations. In the Cape Province, as before noticed, Natives and Coloured persons in theory have the same status as Europeans, including admission to the parliamentary franchise. In respect of this latter privilege, however, it must be observed that, although the voter's qualifications are the same for the non-European as for the European population—i. e. a low property or income qualification, and the ability on the part of the voter to sign his name and write his address and occupation—the value of the 'Coloured' vote was reduced materially by an original distribution of seats so arranged as to counterbalance the numerical superiority of the non-European population. Thus the average population per member of the mainly non-European constituencies in the (former) Cape Colony was four or five times as large as that of the mainly European constituencies. The Cape franchise, however, is not acceptable to the other provinces, chiefly, though not exclusively, because their respective Native populations are less advanced in civilization; and it remains therefore for the Union legislature to formulate a political and social status for non-Europeans applicable to all four provinces. For the successful performance of this duty time as well as statesmanship will be required; since, apart from the question of the franchise, it involves the readjustment and consolidation of the various laws, including police regulations and the Pass system, to which non-Europeans alone are subject in the several provinces.

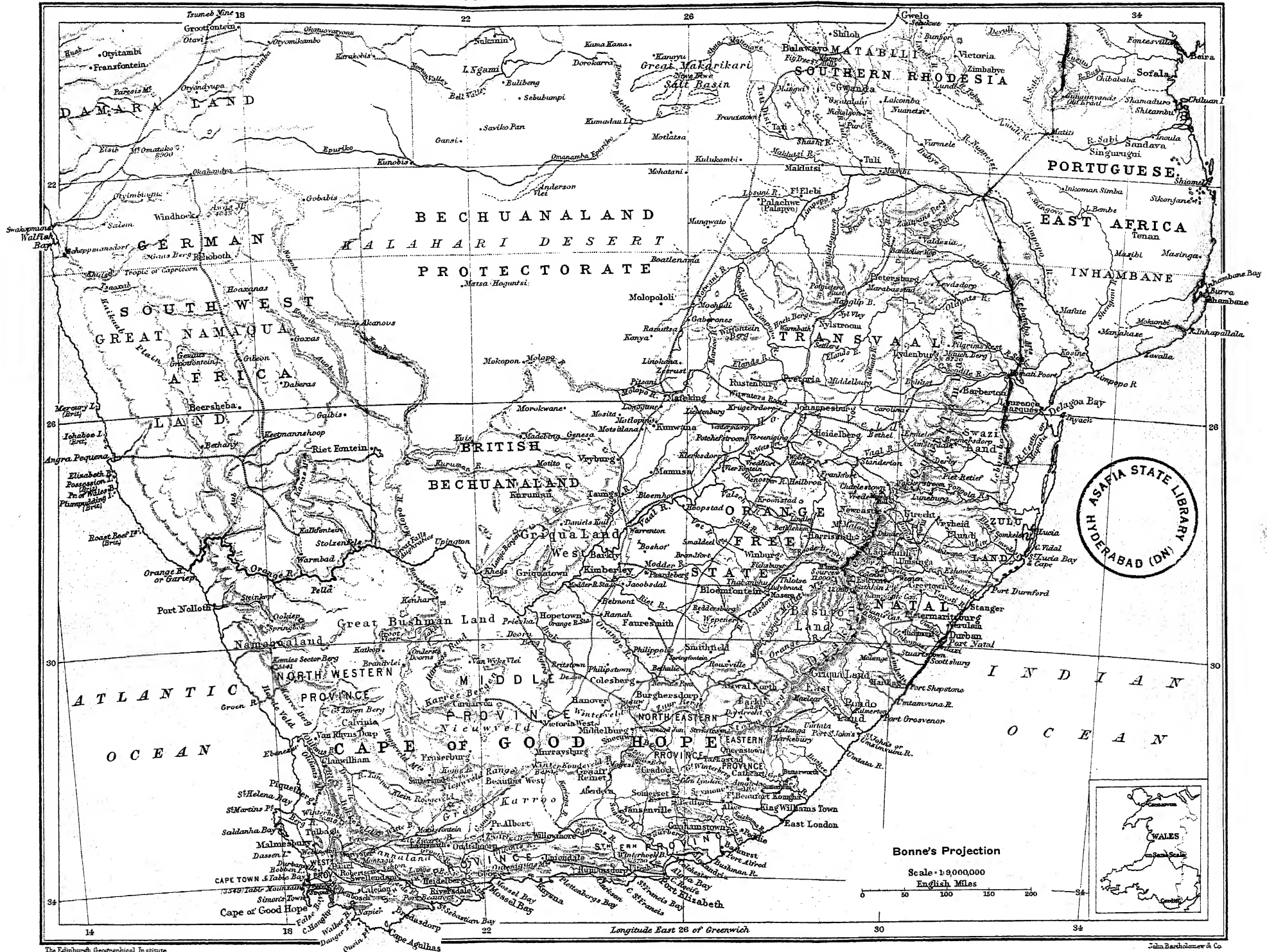
Represent-
ation of
non-
European
population.

There are various electoral devices by which the principle of limited representation can be put into effect; but the system actually recommended by the Inter-Colonial Native Affairs Commission of 1903-5 has a special claim to attention. Its essence is the separate voting of non-European electors for a fixed number of members to be determined by the legislature. Under this system independent electoral divisions, with separate voters' lists and candidates, would be created for the non-European population, and no Native or Coloured man would vote in any European constituency. The Commission further recommended that the qualification should be the same for non-European as for European voters; that the qualification of the members to be elected by the non-European constituencies should be determined by the legislature; and that the number of seats to be granted should not be more than 'sufficient to provide an adequate means for the expression of the views, and the ventilation of the grievances, if any, of the non-European population', and should not be 'regulated by the numerical strength of the Native vote'.

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UNION OF SOUTH AFRICA - POLITICAL.



CHAPTER VIII

GOVERNMENT AND FINANCE OF THE UNION

BY THE HON. SIR RICHARD SOLOMON

Government and Administration ¹

ON the 31st of May, 1910, the self-governing colonies of the Cape of Good Hope, Natal, the Transvaal, and the Orange River Colony were united in a legislative union under one government, under the name of the Union of South Africa, and became original provinces of the Union with the same names and boundaries, excepting that the Orange River Colony was henceforth to be known as the Orange Free State. The constitution of the Union is embodied in the South Africa Act, 1909, passed by the Imperial Parliament, without any modification of its provisions, which had previously received the approval of the legislature of each of the afore-mentioned self-governing colonies. It is a unitary constitution as distinguished from a federal one. It possesses none of the three characteristics of federalism, named by Professor Dicey in his work on the Law of the Constitution: to wit, the supremacy of the constitution, the distribution, among bodies with limited and co-ordinate authority, of the different powers of government, each supreme in respect of the powers conferred on it, and the authority of the courts to act as interpreters of the constitution.

Under the constitution of the Union its Parliament is supreme in all matters within the Union, subject to the limitations which the British Constitution imposes upon all colonial Parliaments; and unlike the federal constitutions of Canada and Australia, it may, subject to certain qualifications, be amended by Parliament by a simple act of legislation in the same way as any other law may be amended.

¹ The late Sir Richard Solomon desired to acknowledge his indebtedness to Mr. R. H. Brand's work on *The Union of South Africa*, from which, with Mr. Brand's permission, he borrowed extensively.

Amend-
ments.

There are certain provisions relating particularly to the legislature, for the operation of which a definite time is prescribed, which cannot be amended at all during such period; and there are certain other provisions, such as those relating to the native franchise in Cape Colony, to the equal treatment accorded to the English and Dutch languages, and to what are known as equal rights, which can only be amended by an Act passed by both Houses of Parliament sitting together, and at its third reading agreed to by not less than two-thirds of the total number of members of both Houses. The section of the constitution, however, which defines the various methods of amending it can itself be amended in the same way by a similar majority of two-thirds. The only limitation therefore on the supreme power of Parliament over the constitution is the requirement of a two-thirds majority in certain particular cases.

Admission
of new
territories
into the
Union.

Though, as has already been stated, the Union at present includes only the former colonies of the Cape of Good Hope, Natal, the Transvaal, and the Orange Free State, provision is made in its constitution for the admission into it by His Majesty, on the advice of the Privy Council, of the territories administered by the British South Africa Company, on such terms and conditions as to representation and otherwise as are expressed in addresses from the Houses of Parliament of the Union petitioning for such admission. Further provision is made for the admission into the Union of the native protectorates, Basutoland, Bechuanaland, and Swaziland, at present under the direct control of the Crown. A schedule is attached to the constitution embodying the terms and conditions upon which the government of any of these protectorates, when transferred to the Union, shall be administered.

Provincial
govern-
ment.

Although ultimate authority is centred in the Parliament of the Union, the dangers of too great centralization are attempted to be avoided by the grant of fairly wide powers of local government. In each province a provincial council is established to which legislative and

administrative powers are expressly delegated in respect of certain local matters, either expressly defined in the constitution or which, in the opinion of the Governor-General-in-Council, are of a merely local or private nature in the province, and in respect of such other matters as Parliament may by law delegate to it the power of legislating. The establishment of these provincial councils does not detract from the supremacy of the Parliament of the Union, which can legislate even on matters delegated to these councils, and any law made by a provincial council has effect only as long and as far as it is not repugnant to an Act of Parliament. In this respect these councils differ widely from the provincial or state legislatures under federal constitutions, which are supreme in the matters over which they have jurisdiction, and any law of the federal Parliament dealing with any such matter is *ultra vires* and of no effect.

The legislature of the Union consists of two houses, ^{The Legis-} a Senate and a House of Assembly. The constitution of ^{lature.} both Houses is federal in character, in this respect, that both are constituted on a provincial basis. The Senate consists of forty members, of whom eight are nominated by the Governor-General-in-Council and eight elected by each of the original provinces of the Union. Except in the case of the nominated members the principle of equal representation among the provinces, common to strictly federal constitutions, is followed; and this principle is secured for ten years, and after the expiration of that period only until Parliament otherwise determines.

The method by which the members of the first Senate ^{Election.} were elected, in accordance with the constitution, is novel. The two Houses of the Legislature of each of the four self-governing colonies, now included in the Union, prior to their dissolution on the establishment of the Union, met together and elected the eight senators who were to represent that province, and the senators so elected hold their seats for ten years. In the event of any vacancy arising in the representation of a province such vacancy is to be filled by election by the members of the provincial

council thereof, and, if at the end of ten years no other provision is made by Parliament, the members of the second Senate will be elected jointly by the members of the provincial council and the members of the House of Assembly representing the provinces concerned, and any vacancy will be filled in a similar manner. The election of senators in all the above-mentioned cases is by means of proportional representation. It will be seen, therefore, that there are actually four methods of choosing senators, namely—nomination by the Governor-General, election by the old legislatures of the absorbed colonies prior to their dissolution, election by the provincial councils, and election jointly by the provincial councils and certain members of the House of Assembly.

The
Senate:
legislative
powers.

The only restrictions imposed on the legislative powers of the Senate are: (1) that all bills appropriating revenue moneys or imposing taxation must originate in the House of Assembly, and (2) that it may not amend any bill so far as it imposes any charge or burden on the people nor so far as it imposes taxation or appropriates revenue or moneys for the services of the Government. Subject to these restrictions the Senate is free to initiate any legislation and to amend or repeal any bill passed by the Assembly.

If the House of Assembly, however, passes any bill and the Senate rejects or fails to pass it, or passes it with amendments to which the House of Assembly will not agree, and such bill, during the next session of Parliament, is again passed by the Assembly with or without any of the amendments made or agreed to by the Senate, and the Senate rejects or fails to pass it or passes it with amendments to which the House of Assembly will not agree, the Governor-General may, during that session, convene a joint sitting of the two Houses at which the members present shall deliberate and vote together upon the bill as last proposed by the House of Assembly and upon amendments, if any, which have been made therein by one House and not agreed to by the other, and any such amendments which are affirmed by a majority of the total

number of members of the two Houses present at such joint sitting shall be taken to have been carried ; and if the bill with amendments, if any, is affirmed by a majority of the members at such joint sitting it shall be taken to have been duly passed by both Houses of Parliament. With regard to a bill dealing with the appropriation of revenue or moneys for the public service which the Senate rejects or fails to pass, any such joint sitting as aforesaid may be convened during the session in which the Senate so rejects or fails to pass it.

In the composition of the House of Assembly the same principle of provincial representation is preserved. The members are not distributed on a uniform basis throughout the Union, but a certain number is allotted to each province, and the ultimate basis on which the allocation rests is the number of European male adults in each province. To start with, a smaller representation than they were strictly entitled to on that basis was given to the Cape of Good Hope and the Transvaal provinces (the former being represented by fifty-one and the latter by thirty-six members), in order to allow a larger representation to the two smaller provinces of Natal and the Orange Free State, to each of which seventeen members were allotted. Thus the House of Assembly is at present composed of one hundred and twenty-one members, and no province can have its representation reduced until the total number of members of the House reaches one hundred and fifty, or until the expiration of ten years after the establishment of the Union, whichever period is the longer.

House of
Assembly:
represent-
ation.

Elaborate provisions determine the increased representation to be allotted to each province in the case of an increase in its adult male white population. The process is to go on automatically until the number of members of the House of Assembly reaches one hundred and fifty, when there will be no further increase, and they are then to be distributed without reference to provincial boundaries, so that throughout the Union the proportion of European male adults to each member may

be as far as possible the same in each province, and in that way, after a limited period of time, the House of Assembly will be framed on a national instead of a provincial basis.

Electoral
divisions.

Although at present the number of members allotted to each province is not proportional to the number of white male adults, but was arbitrarily fixed so as to satisfy the two smaller provinces, yet within each province the distribution of the members allotted to it follows a definite principle of 'one vote one value'. In order to carry out this principle, each province, before the first general election of members of the House of Assembly, was divided into one-member electoral divisions by a commission of judges in such a manner that each division, subject to a certain latitude given to the commissioners, contains a number of voters as nearly as may be equal to the quota obtained by dividing the total number of voters in the province, as ascertained at the last registration of voters, by the number of members of the House of Assembly to be elected therein. The commission, in making the delimitation of these electoral divisions, was authorized, whenever it thought it necessary, owing to the sparsity or density of population or for other specified reasons, to depart from the strict quota, to the extent of 15 per cent. either above or below it. A re-division of the electoral divisions by a commission of three judges of the Supreme Court must be made on the principles above laid down after every quinquennial census, but can only come into operation at the next general election held after the completion of the re-division.

Franchise
qualifica-
tions.

The constitution does not establish a uniform qualification for a parliamentary voter throughout the Union. In the circumstances existing when it was established, it was impracticable to extend the franchise of the Cape of Good Hope, which made no distinction between Europeans and Coloured persons, to the other provinces where a strong feeling existed against the enfranchisement of the Coloured man. It was also impossible to have deprived the Cape Coloured voters of political rights which they

possessed and had exercised for more than half a century. Manhood suffrage, which existed in the colonies of the Transvaal and Orange River, was not acceptable to the Cape and Natal, where a property qualification was required by a parliamentary voter. To avoid these difficulties, or rather to leave them to be solved in time by the Parliament of the Union, the parliamentary franchise of each colony, as it existed at the date of the union, was left undisturbed, but, while providing that Parliament may by law prescribe the qualifications necessary to entitle persons to vote at parliamentary elections, the constitution safeguards the native franchise in the Province of the Cape of Good Hope by the provision 'that no such law shall disqualify any person in the Province of the Cape of Good Hope, who, under the laws existing therein at the establishment of the Union, is or may become capable of being registered as a voter, from being so registered in that province, by reason of his race or colour only, unless it was passed by both Houses of Parliament sitting together, and at the third reading thereof was agreed to by not less than two-thirds of the total number of Members of both Houses. A law so passed at such joint sitting shall be taken to have been duly passed by both Houses of Parliament'. There is also a further provision that 'no person, who, at the passing of any such law, is registered as a voter in any Province, shall be removed from the register by reason only of any disqualification based on race or colour'.

While Cape Town is the seat of the legislature, Pretoria is the seat of the executive. It is no doubt a curious arrangement by which the executive government has its seat one thousand miles from where Parliament sits, but, on the question of a capital, there had to be some compromise; otherwise union would not have been brought about.

The provisions in the constitution with respect to the executive do not depart from British precedent. It provides for not more than ten ministers administering Departments of State, all of whom must be members of

Legis-
lative and
executive
capitals.

The
executive.

Parliament. On the establishment of union the full number of ministers authorized were appointed, but for reasons of efficiency and economy the number has now been reduced to seven, administering respectively the following Departments of State—Agriculture ; Justice and Native Affairs ; Finance and Defence ; Posts, Telegraphs, and Public Works ; Railways, Ports, and Harbours ; Education and Mines ; Land and Internal Affairs.

At the present time the Prime Minister administers the Department of Agriculture, and there is, in addition to the seven ministers holding portfolios, a minister without portfolio and without pay. The Prime Minister is voted a salary of £4,000 per annum, while the annual salary of each of the other ministers is £3,000.

The government is clothed with all the powers and authorities formerly vested in the several governments of the colonies now included in the Union, except such as are vested in some other authority, such as the administrator of a province. As has already been stated, the seat of the executive is in Pretoria, where the principal residence of the Governor-General is situated. All acts of the government are by the Governor-General-in-Council.

The provincial
constitu-
tions.

The constitution of each province has three main organs. There is an administrator appointed and paid by the government of the Union ; a council elected by the same electors as the House of Assembly, and consisting, in the case of the Transvaal and Cape of Good Hope, of the same number of members as represent these provinces respectively, but in the case of Natal and Orange Free State of twenty-five members ; and an executive committee consisting of the administrator and four members elected by the provincial council but not necessarily members of it.

The adminis-
trator.

The administrator is appointed for five years and cannot be removed from office before the expiration of that period, except by the Governor-General-in-Council for cause assigned, which must be communicated by message to both Houses of Parliament. In his name all executive acts relating to the local affairs of his province

must be done, and his salary is fixed and provided by Parliament.

Each provincial council continues for three years from the date of its first meeting and is not subject to dissolution save by expiration of time. The executive committee is elected under the system of proportionate representation at the first meeting of the council after the general election, and its members hold office until their successors are elected in the same manner, and receive such remuneration as the provincial council, with the approval of the Governor-General-in-Council, shall determine.

The committee carries on the administration of provincial affairs on behalf of the council, and all powers, authorities, and functions which, at the establishment of the Union, were in any colony (now a province) vested in or exercised by the Governor or the Governor-in-Council, are now vested in that committee so far as such powers, authorities, and functions relate to matters in respect of which the provincial council is competent to make laws (called ordinances), and which include such subjects as direct taxation within the province, the borrowing of money on the credit of a province with the consent of the Governor-General and in accordance with regulations framed by Parliament, education other than higher education, agriculture to the extent and subject to the conditions defined by Parliament, the establishment and maintenance of hospitals, municipal and divisional councils, local works and undertakings other than railways and harbours, roads, bridges, markets, and so forth, and, generally, all matters which in the opinion of the Governor-General-in-Council are of a purely local or private nature in the province, and all matters in respect of which Parliament may by law delegate the power of legislation to the provincial council.

Any ordinance made by a provincial council has effect as long and as far only as it is not repugnant to an Act of the Union Parliament, and must in every case receive the assent of the Governor-General-in-Council. The

financial relations existing between the Union and the provinces and the methods of supplying the provincial councils with funds necessary for the due performance of the services and duties assigned to them are dealt with in the section relating to finance. It is sufficient to say here that the financial as well as the legislative control of Parliament over the provincial councils is complete.

Judicature
and law.

The supreme court of the Union is styled 'The Supreme Court of South Africa', and consists of a chief justice, the ordinary judges of appeal, and the judges of its provincial and local divisions: the former of which include what were, before the establishment of the Union, the several supreme courts of the colonies (now provinces), while the latter include the Court of the Eastern Districts, established in Grahamstown, the High Court of Witwatersrand, and the several circuit courts.

Supreme
Court.

The provincial and local divisions of the Supreme Court have all the original jurisdiction exercised by them prior to the establishment of the Union, and in addition thereto have jurisdiction in all matters (a) in which the Government of the Union or a person suing or being sued on behalf of such government is a party, and (b) in which the validity of any provincial ordinance is challenged.

Appellate
Division.

The Appellate Division of the Supreme Court consists of a chief justice, two ordinary judges of appeal, and two additional judges who are assigned by the Governor-General-in-Council to that division from any of the provincial or local divisions of the Supreme Court, but who perform their duties as judges of their respective divisions when their attendance is not required in the Appellate Division.

Before the establishment of Union, appeals in civil cases lay from the High Court of Southern Rhodesia to the Supreme Court of the Cape of Good Hope. All such appeals, as well as all appeals in civil cases which, before the Union, might have been made to the Supreme Court of any colony from any of its superior courts, can now only be made to the Appellate Division of the

Supreme Court of South Africa, except in cases of orders or judgements given by a single judge upon application by way of motion or petition, or on summons for provisional sentence, or of judgements as to costs only which by law are left to the discretion of the court. The appeal from any such orders or judgements given by any superior court in the province, as well as appeals in criminal cases from any such superior court, and appeals from the courts of resident magistrates or other inferior courts in a province, are made to the Provincial Division of the Supreme Court, from which an appeal in all such matters lies only to the Appellate Division, and then only after such division has given special leave to appeal.

Save as to judgements given by the Appellate Division of the Supreme Court under the Colonial Courts of Admiralty Act, 1890, no appeal lies from the Supreme Court of South Africa or from any of its divisions to the King-in-Council. This provision, however, does not impair any right which the King-in-Council may be pleased to exercise to grant special leave to appeal from the Appellate Division to the King-in-Council, but power is reserved to Parliament to limit by law the matters in respect of which such special leave may be asked. Any such law, however, must be reserved by the Governor-General for the signification of His Majesty's pleasure.

The Appellate Division sits in Bloemfontein, the capital of the Orange Free State, but, if it considers that exceptional circumstances exist which make it more convenient for suitors that an appeal to it should be held at some other place, it may sit there for that purpose.

The laws in force before the establishment of the Union regulating the admission of advocates and attorneys to practise before any superior court of any of the colonies, included in the Union as original provinces, apply to their admission to practise in the corresponding division of the Supreme Court of South Africa ; and all advocates and attorneys entitled at the establishment of the Union to practise in any superior court of any of the colonies are entitled now to practise as such in the corresponding

Appeal to
the King-
in-Council.

Admission
of advo-
cates and
attorneys.

division of the Supreme Court of South Africa and also before the Appellate Division.

Common
law of the
Union.

The Roman Dutch law, as it existed in Holland at the time of the capitulation of the Cape of Good Hope to Great Britain in 1806, with such modifications as have been made in it by local customs and by statute, is the common law of each of the provinces of the Union of South Africa. In the case of *Seaville v. Colley* (9 Juta's Report) the Chief Justice of the Supreme Court of the Cape and now Chief Justice of the Supreme Court of South Africa said, 'They (the body of laws introduced from Holland before 1806) are not all to be found in any code or authentic document to which easy reference can be made, and it is often only through a judicial decision upon a disputed question that the legislature becomes aware of the existence of a particular law. The conclusion at which I have arrived as to the obligatory nature of the body of laws in force in this colony at the date of the British occupation in 1806 may be briefly stated. The presumption is that every one of these laws if not repealed by the local legislature is still in force. This presumption will not, however, prevail in regard to any rule of law which is inconsistent with South African usages. The best proof of such usages is furnished by unoverruled judicial decisions. In the absence of such decisions the Court may take judicial notice of any general custom which is not only well established but reasonable in itself. Any Dutch law which is inconsistent with such well established or reasonable custom and has not been distinctly recognized and acted on by the Supreme Court may fairly be held to have been abrogated by disuse.' These observations would probably apply to each of the colonies (now provinces) of the Union.

It must be remembered, however, that each of these colonies had its own legislature and supreme court, and the modifications made in the Roman Dutch law by statute consequently vary in the different provinces. The judicial interpretation of some of the principles of the Roman Dutch law by the supreme courts of the several

colonies, now incorporated in the Union, have differed, and there is not therefore at present uniformity in the law of the Union. Such uniformity can only be gradually brought about by Parliament and by the Appellate Division of the Supreme Court.

It may be fairly said, however, that in each of the provinces wherever the Roman Dutch law was undeveloped or archaic in character, the English law has in substance been adopted. In commercial law especially the influence of English statutes and case law has been enormous. The law of procedure and practice is largely English, but retains in some respect Roman Dutch nomenclature and also some peculiarly Dutch institutions such as 'provisional sentence'; 'arrest to found jurisdiction', and 'edictal citation'.

The internal defence of the Union¹ has been adequately Defence. secured on broad lines by the Defence Act, passed during the 1912 session of Parliament, which makes every male British subject between the ages of seventeen and sixty, with a few exceptions not necessary to mention, liable to personal service in time of war in defence of the Union in any part of South Africa. This means that, according to the last census returns, something like 440,000 men would be available for service in an extreme emergency.

The defence forces comprise (a) the Permanent Force; (b) the Coast Garrison Force, for the defence of the harbours and coasts; (c) the Citizen Force, consisting of all persons who are liable to render personal service in time of war and are not members of the Permanent Force, the Coast Garrison Force, or the Royal Naval Volunteer Reserve; (d) the Royal Naval Volunteer Reserve, consisting of volunteers bound to general service in the Royal Navy in emergency, and forming part of the Royal Naval Reserve, constituted under the Imperial Naval Forces Act 1903, under the designation of the South African Division of the Royal

¹ The strategical considerations associated with the problem of the defence of South Africa, together with further particulars of the functions of the various forces, are discussed in Chapter XXIII.

Naval Volunteer Reserve ; and (e) any special reserve established under the Act.

Citizen
Force.

The Citizen Force comprises three divisions : (1) the Active Citizen Force, consisting of officers, senior and non-commissioned officers and men trained to special duties, who are appointed thereto ; of citizens between seventeen and twenty-five years of age who have been entered for or are undergoing peace training in that force, and of other citizens who are permitted to extend their service in that force after their twenty-fifth year in units specially appointed by the Governor-General for such extended service ; (2) the Citizen Force Reserve, divided into two classes, the one consisting substantially of all citizens not past their forty-fifth year who have undergone the peace training prescribed by the Act, and the other consisting of all other citizens not past their forty-fifth year who are serving or have served as members of a rifle association and have learned the use of a rifle ; and (3) the National Reserve, consisting of all citizens in the Union who, not being members of any other portion of the defence forces, are liable to render personal service in time of war.

Course of
training.

The course of peace training for each person in the Active Citizen Force extends from the 1st of July in the year of his entry into that force to the 30th of June in the fourth year from that date, but does not exceed thirty days in each training year during which a citizen is being trained as a recruit, and twenty-one days during any other training year.

Although every citizen may be required to commence peace training not later than his twenty-first year and complete it not later than his twenty-fifth year, in order to avoid the expense which at present is unnecessary, only 50 per cent. of the total number liable to such training in any year actually undergo it. The number required for this purpose is secured by machinery which is laid down in the Act and is briefly as follows : For defence purpose the Union is divided into military districts, under the charge of an officer of the instructional and administrative staff, who is responsible for the military organization

of his district. In January of the first year after the Act came into force (1912) all citizens liable to peace training and who attained any age between seventeen and twenty-five (both years inclusive) during that year, were compelled to register themselves before the officer of the district in which they resided, and in January of every succeeding year all such citizens who attain the age of seventeen years in that year must register themselves in a similar manner. Any of the persons registered within a year may apply to be entered for peace training in that year, and if the number of such volunteers in any military district fall short of a number required for peace training from that district and notified by proclamation in the Government Gazette, the shortage is made good by ballot in manner described in the Act.

Every citizen liable to peace training, who, in his twenty-first year, has not been entered for it, must, unless medically unfit for military service, be enrolled as a member of a rifle association on the 1st July of that year, and must, until the 30th June in his twenty-fifth year, undergo annually a prescribed course of training in the care and use of the rifle and such other prescribed training as will render him fit to take his place in the field as a member of the corps to which he may be assigned.

The Act makes it the duty of every employer to give all proper facilities for enabling a citizen in his employ to enter upon and carry out any service or training for which he is liable; and makes it an offence, punishable with fine or imprisonment or with both, if an employer fails to give such facilities, or if he dismisses an employee or reduces his wages or in any other manner penalizes him for entering upon or carrying out any such service or training, or if by words or conduct directly or indirectly he compels or induces any person in his employ or seeking to enter it to refrain from doing any service or training for which he is liable. The burden of proof, in any proceedings against the employer, that any person employed by him, who has been dismissed or reduced

Liability of employers as to facilities for training.

in salary or in wages or in any other manner penalized, was so treated for some good and sufficient reason, in no way connected with such service or training, is cast on the employer.

Naval
defence.

Serious attention has been given to the basis on which the Union of South Africa should bear its share of the burden of defending the Empire on sea, and it may be confidently stated that before long the Union will worthily fulfil its obligations in that respect. The question is further considered in Chapter XXIII.

Native
affairs.

The relation between the races of European descent and the aboriginal Native and mixed Coloured races presents the most anxious and difficult problem with which the Union of South Africa is faced, and, while probably no civilized government in the world is free from the burden of that problem, it does in South Africa reach the zenith of its difficulty and complexity. This is not the place to speculate on any general native policy for the Union—the problem has been considered in the preceding chapter—but certain facts in connexion with administration must here be detailed.

Methods
of govern-
ment of
natives.

There are different methods of governing this mixture of Coloured races, in various degrees of civilization, in the several provinces of the Union hitherto under separate governments and parliaments. The majority of the aboriginal natives reside in areas reserved for them, and though governed through the agency of white officials, live under a social code which differs widely from that of the white man.

Basuto-
land :
Bechuana-
land Pro-
tectorate.

In Basutoland and the Bechuanaland Protectorate the basis of administration is practically identical. These territories are governed each by a Resident Commissioner under the direction of the High Commissioner of South Africa, who is responsible for legislating for the peace and good government of these territories. The native chiefs, whose co-operation in the administration of the country is sought and to whom official support is given, so long as their authority is not exercised by methods abhorrent to civilization, adjudicate in cases between

native and native according to their own laws and customs, with a right of appeal to the Courts of Assistant Commissioners and of final appeal to the Resident Commissioner. There is a native council consisting of about one hundred representatives, selected partly by the natives and partly by the government; its functions are only advisory, but it provides a useful channel of communication between the people and the Resident Commissioner, and the means of ventilating opinions and grievances.

The land in Basutoland and in the reserves in the Bechuanaland Protectorate is set apart for the natives, who occupy it under tribal tenure, and no portion of it can be alienated to Europeans. In both territories, as indeed in all areas in South Africa occupied principally by natives, the sale of intoxicating liquor is strictly forbidden by law. This system of paternal government is admirably suited to natives living under tribal conditions, and has been eminently successful. It is personal, consistent, and continuous, whereas under direct parliamentary government there are often changes of policy which perplex and disturb the native mind.

Reference should be made to the Transkeian native territories which were annexed at different dates between 1879-94 to the Cape Colony, and are now under the control of the Government of the Union. The system of administration of these territories is to some extent analogous to that prevailing in Basutoland, but it is also impregnated with the liberal policy which Cape Colony has always adopted in dealing with Natives and Coloured persons. Legislation for these territories is as a rule by proclamation of the Governor-General-in-Council; but power is reserved to Parliament to extend, by express provision, the application of any Act of Parliament of Cape Colony to these territories, whose natives enjoy the same parliamentary franchise as those in the Cape Colony proper.

The creation of the Transkeian General Native Council, under the Glen Grey Act, has had an extraordinary effect

in arousing among them an interest in the management of their local affairs, and has materially assisted the government in the administration of these territories. It consists of three native members from each district, of the magistrates of these districts as *ex officio* members, and of the chief magistrate as chairman. It has authority to deal with such subjects as education, the establishment of schools and agricultural institutions, irrigation, roads, and bridges, and has power to levy rates for the purpose of defraying the expenditure incurred by it. The success of this council bears eloquent testimony to the fact that the natives are capable of rising high in the scale of civilization.

Judging by the progress, contentment, and loyalty of the native population in the territories to which special reference has been made, the system of governing them at present in force seems to be eminently adapted to their circumstances and is not likely to be substantially altered. The schedule attached to the South Africa Act which embodies the principles on which the native territories, now under the control of the Crown, should be governed when admitted into the Union, substantially adopts the system of administration now in force in those territories.

Native
problem
in non-
native
territories.

The administration of the native territories in South Africa, however, is the least difficult part of the native problem. There are hundreds of thousands of Natives and Coloured persons in different stages of civilization living amongst Europeans and in daily contact with them. Their number is rapidly increasing, not only from natural causes, but by immigration from the native territories of those who are sufficiently advanced in civilization to fret under the restraint of tribal laws and customs. It is in connexion with these Natives and Coloured persons that the problem is so difficult, delicate, and complicated. It is far more difficult than the analogous problem in the United States or in New Zealand, for in the former the negro population is only one-tenth of the European, while in New Zealand the Maoris are only one-twentieth

of the European population and live mainly in one district.

The problem is complicated by the fact that by the establishment of the Union different Native policies have been adopted in the four colonies now forming the Union. In the Cape Colony, the oldest of them all, no colour bar has ever existed in respect of the parliamentary franchise, and the Native possessing that franchise is exempted from the operation of all laws which impose disabilities on Natives. In the Transvaal and Orange Free State, and practically in Natal, there was before union and still is a complete colour bar, and only Europeans can be registered as parliamentary voters. In Natal a rigid code of Native law has been in force for many years, applicable to members of the Native tribes of South Africa, which, appropriate as it may be to Natives living under tribal conditions, is wholly unsuited to those who have emerged from the restriction of tribal laws and are living among Europeans according to Christian and civilized standards of life. It is exceedingly difficult for a Native, however highly educated, to become exempt from the operation of this code.

During the 1913 session of the Parliament of the Union, an Act was passed making provision for the purchase and leasing of land by Natives and other persons in the several parts of the Union. The main object of this measure is to separate as far as possible Natives and Europeans in the ownership and occupation of land. The Act provides for the appointment of a Commission of not less than five persons to inquire and report within two years after the commencement of the Act what areas within the Union should be set apart for such separate ownership and occupation.

Native
land
tenure and
franchise :
Act of
1913.

A schedule is attached to the Act defining certain areas within which (until Parliament, acting upon the report of the Commission, shall make other provision) no person other than a Native shall, except with the approval of the Governor-General, purchase, hire, or in any other manner acquire any land or interest in land, or enter

into any agreement or transaction for such hire, purchase, or acquisition. The Act further prohibits transactions between a Native and a person other than a Native for the purchase, hire, or other acquisition of land or any interest therein situated outside the Native areas defined in the schedule, except with the approval of the Governor-General.

A person who is a party to an attempt to purchase, sell, hire, or lease any land in contravention of the provisions of the Act is guilty of an offence and is liable on conviction to a fine not exceeding £100, or in default of payment to imprisonment with or without hard labour for a period not exceeding six months, and if the act constituting the offence be a continuing one the offender is liable to a further fine not exceeding £5 for every day during which the offence continues.

Exemption in
Cape
Province

In view of the fact that under the South Africa Act, 1910, by which the Union is established, the Native parliamentary franchise in the Cape of Good Hope is safeguarded by the provision mentioned in the section of this article relating to 'franchise qualifications', and the further fact that the occupation of land is one of the qualifications for the parliamentary franchise in the Province of the Cape of Good Hope, the Act provides that the restrictions imposed by it upon the acquisition by any person of land or rights thereto, interests therein or servitudes thereon, shall not be in force in the Province of the Cape of Good Hope if and for so long as such person would, by such restrictions, be prevented from acquiring or holding a qualification whereunder he is or may become entitled to be registered as a voter at parliamentary elections in any electoral division in the said province. This provision practically makes the provisions of the Act by which its main object is to be carried out inoperative in the said province.

Public
Service.

The constitution requires the Governor-General-in-Council to appoint a permanent Public Service Commission with such powers and duties, relating to the appointment, discipline, retirement, and superannuation

of public officers, as Parliament shall determine. In fulfilment of this requirement, the Parliament of the Union passed an Act in 1912 providing for the organization of, and discipline in, its public service, and regulating the retiring pensions of officers appointed since the establishment of the Union (May 31, 1910). Any officer, appointed prior to that date to the public services of any of the colonies before they were united and taken over into the public service of the Union or assigned to that of a province, retains all his existing and accruing rights and is entitled to retire from the service at the time at which he would have been entitled by law to retire, and on the pension or retiring allowance to which he would have been entitled by law in like circumstances, if the Union had not been established.

Under the Act mentioned a Public Service Commission ^{The Public Service Commission.} has been appointed consisting of three members, one of whom is the chairman, each holding office for a period of five years, during which his salary as fixed by Parliament cannot be reduced, nor can he be removed from office except by the Governor-General for cause assigned, which must be communicated by message to both Houses of Parliament. No member of the Commission may hold any other office or post in the public service or be engaged in any remunerative employment outside his duties as such member. The powers and duties of the Commission relate mainly to the appointment, promotion, discipline, retirement and superannuation of officers of the public service, and are prescribed in the Act. Generally speaking the Commission is required to make recommendations for appointments and promotions in the public service, for the control, reorganization, and readjustment of any of its departments or offices, and for the retirement from the service in consequence of any such reorganization or readjustment. It must also inquire into such allegations of misconduct as may be referred to it, and recommend what action should be taken in consequence thereof. Although the recommendations of the Commission on any of the above matters are not binding on the government,

specific mention must be made of any instances in which appointments to the service have been made otherwise than on its recommendation, in the annual report which the Commission is required to make on all matters dealt with by it, and in any special report which it may think it desirable to make from time to time. All these reports must be laid before Parliament.

Educa-
tional
qualifica-
tions for
service.

No male person can be appointed to the regular establishment of the public service to fill a clerical post in the administrative and clerical division thereof, unless he passes the matriculation examination of the University of the Cape of Good Hope or an examination which, in the opinion of the Commission, is of a standard as high as or higher than the said matriculation examination, or an examination (called the Public Service Examination) held by the Commission.

An officer entering the public service, after the commencement of the Act, who is appointed to a clerical post in the administrative and clerical division, and has not passed in both English and Dutch at any of the examinations mentioned above, cannot be promoted to any higher grade than that to which he has attained in five years from the date of his first appointment to such post, unless he passes such an examination in both these languages as may be prescribed.

Public
service
pensions.

The pensions of officers appointed to the public service since May 31, 1910, are regulated by the same Act. Space does not permit of full details being given of the elaborate provisions of the Act relating to this subject. It may be generally stated that three funds are established out of which pensions are paid, the Administrative and Clerical Division Pension Fund, the General Division Pension Fund, and the Defence, Police, and Prison Pension Fund, each of which consists of (1) contributions made by members of these divisions respectively at the rate (with certain exceptions not necessary to refer to) of 4 per cent. of his salary, and (2) payments out of the Consolidated Revenue Fund equal to the aggregate of such current contributions. The annuity or annual sum, payable

during the lifetime of a retired or retiring officer out of any of these funds, is based on the average salary of such officer for the whole period of his contributions, or for the last thirty years thereof, whichever period may be the shorter (provided that contributions have been made by him in respect of a period of ten years or more), and is to be calculated at the rate of one-sixtieth of that average for each year of contribution.

For purposes of the Act the public service does not include persons in the employment of the Department of Railways and Harbours, whose organization and discipline and pension rights are provided for in a separate Act (No. 28 of 1912), nor does it include the Judges of the Supreme Court. The salaries and pensions of such as were judges of the supreme courts of the several colonies (now included in the Union) were fixed by the parliaments of these colonies and varied considerably. By an Act of the Parliament of the Union passed in 1912, without interfering with the salaries and pensions enjoyed by the several judges before the establishment of the Union, uniformity in these emoluments is provided in the case of those who have been or are to be appointed after the commencement of the Act, on the following scale. The Judges' pensions.
Chief Justice of the Supreme Court is to enjoy a salary of £3,000 per annum with a yearly pension of £1,300, an ordinary judge of appeal £2,750 with a pension of £1,200, a judge president of a provincial or local division of the Supreme Court £2,500 with a pension of £1,100, and a puisne judge of such division £2,250 with a pension of £1,000.

A judge of the Supreme Court is entitled to a pension under the Act on his retirement from office after continuous service for a period of ten years or more, and when he has reached the age of sixty-five. Provision is made that if a judge becomes permanently afflicted physically or mentally, so as to be unable properly to discharge his duties, before he has reached that age, or although he has reached that age before he has served in his office for ten years continuously, he may be allowed

to retire from office or even be removed therefrom on a pension calculated for any completed year of actual service at the rate of £130 in the case of the Chief Justice, £120 in the case of an ordinary judge of appeal, £110 in the case of a president of a provincial or local division of the Supreme Court, and £100 in the case of a puisne judge of such division. In no event is the pension so paid to be less than £400 per annum.

*Finance*¹

Finance
of the
Union.

The statistical appendices contain particulars of the revenue and expenditure since the establishment of the Union (May 31, 1910). Comparison with the revenue and expenditure of the four colonies before union is rendered practically impossible by changes in the methods of accounting and the fact that, while in the Cape and Natal the whole of the revenue and expenditure of the railways and harbours was included in the general accounts, and in the Transvaal and Orange River Colony the net revenue of the railways was included, since union these accounts have been kept entirely distinct from the general accounts of the Government. Under the South Africa Act which embodies the Constitution of the Union it was laid down that the railways and harbours should be administered on such a basis that their total earnings should be no more than is necessary to meet expenses of working and maintenance and interest on their capital. Four years were allowed for full effect to be given to this provision; in the meantime, a contribution from their profits to the general revenue was permitted, and a contribution was made in 1910-11 of £1,520,000; in 1911-12 of £1,159,000, and in 1912-13 of £500,000. The bulk of the remissions of taxation effected since union has been in the direction of reductions of railway rates: the reductions effected being estimated to amount to £1,336,500 per annum.

¹ For this section it is desired to acknowledge the collaboration of Mr. J. R. Leisk, Secretary to the Department of Finance.

In regard to the general revenue, measures were taken after the union in the direction of removing inequalities of taxation. Stamp duties were made uniform throughout the Union, while the income tax in the Cape Province was abolished and the poll tax in Natal suspended, the result being a reduction in taxation of, approximately, £450,000. Mining taxation was also made uniform without materially affecting the revenue produced thereby.

The principal sources of revenue at the present time are : (a) Customs duties, producing about £4,500,000, the ruling rate being 15 per cent. *ad valorem* with a rebate of 3 per cent. in favour of goods of British manufacture ; (b) Mining revenue, producing in all about £2,300,000, from a profits tax of 10 per cent. on gold and diamond mining and of a rate varying with the profit earned on mining for other minerals, and from receipts accruing through the state ownership of precious metals and stones in the Transvaal and Orange Free State ; (c) Interest at $3\frac{1}{2}$ per cent. on the capital of about £90,000,000 employed by the railways and harbours and postal revenue, producing about £1,500,000. The principal items of expenditure are interest and redemption charges on loans, police, agriculture, and subsidies to the provinces, the bulk of which is for education and educational buildings. The ten months ended March 31, 1911, resulted in a surplus of £850,000 and the following year produced a surplus of £750,000. Under the Public Debt Commissioners Act of 1911 the latter sum and any future surpluses are to be applied to redemption of debt. The debt of the Union amounts approximately to £106,000,000, and there were extant in 1912, £10,922,000 Treasury Bills bearing interest at the rate of $3\frac{1}{2}$ per cent. and $3\frac{3}{4}$ per cent. The average rate of interest on the total debt was 3·4 per cent. Of the 3 per cent. stocks £40,000,000 representing the debts of the Transvaal and Orange River Colony are guaranteed by the Imperial Government. The amount held in sinking funds at October 31, 1912, was, approximately, £6,000,000. The annual provision for redemption of debt by sinking funds or drawings is £650,000.

Revenue,
expendi-
ture, and
debt.

Provincial finance. From the date of union up to March 31, 1913, the funds required to defray the cost of provincial services were provided by grants from the Union exchequer. The principal functions of the provinces are: education up to the university standard, the administration of hospitals and poor relief, the supervision of municipal and other local authorities, and the construction and maintenance of roads, bridges, and local works. Particulars of their expenditure are furnished in the statistical appendices.

The form of government of the Cape Province differs materially from that of the other provinces, inasmuch as in this province there exists a complete system of local government under which the divisional councils and school boards are responsible for raising a great part of the cost of roads and bridges and of education, while in the other provinces the whole cost of these services is met by the provincial government.

Financial relations between Union and provinces. A Commission was appointed in May 1911, consisting of a representative from each province, with the Right Honourable Sir G. H. Murray, G.C.B., the late permanent Secretary to the Imperial Treasury, as chairman, to inquire into the financial relations which should exist between the Union and the provinces. The majority report, which was signed by the chairman and the representatives of the Cape and Transvaal, recommended that a block grant of one-half of the recurrent expenditure of the provinces should be made from the Union exchequer, and that certain sources of revenue, namely the transfer duty, the bulk of the trading licence duties, and school and hospital fees, should be transferred to the provinces. The capital expenditure of the provinces, it was recommended, should be met from advances by the Union exchequer, to be repaid with interest within a certain period, the interest and redemption charges being regarded as part of the recurrent provincial expenditure, and therefore subject to the block grant of one-half. Allowance was to be made for the difference in the Cape system by adding the expenditure met from local taxation to that of the provincial administration in calculating the grant from the



PLATE IX. UNKOMAAS RIVER, NATAL



PLATE X. DEVIL'S HOOK, DRAKENSBERG
(Hieh Commissioner for South Africa)

Union exchequer. A bill was prepared on the lines of this report, with certain concessions to the provinces, in order to relieve them from the necessity of imposing additional taxation in the immediate future, for submission to Parliament during the session of 1913.

[For a general study of South Africa, both physical and (having regard to its period) political, reference may be made to James Bryce, *Impressions of South Africa*, London, 1895; and for bibliographical references further to the works quoted in preceding chapters and the following chapter, see *Mendelssohn's South African Bibliography*, 2 vols., London, 1910, and *Catalogue of Books and Pamphlets relating to Africa South of the Zambesi . . . in the Collection of Dr. George McCall Theal*, Cape Town, 1912.]

CHAPTER IX

RHODESIA

BY L. M. FOGGIN

Natural Conditions

RHODESIA is the name given to the territories controlled by the British South Africa Company under a Royal Charter granted on October 29, 1889. In the charter these are defined as 'the region of South Africa lying immediately to the north of British Bechuanaland and to the north and west of the South African Republic and to the west of the Portuguese dominions'. The territory which is thus vaguely defined extends roughly over fourteen degrees of latitude (from 22° to 8° S. of the Equator) and ten degrees of longitude (from 23° to 33° E. of Greenwich), and its area is about 439,000 square miles. Rhodesia has no direct access to the sea, being bordered on the east by Portuguese East Africa, the Nyasaland Protectorate, and German East Africa. To the north its boundaries are conterminous with portions of the southern frontiers of German East Africa and the Belgian Congo. To the west of Rhodesia lie the Belgian Congo, Portuguese West Africa (often known as Angola), German South-West Africa, and the Bechuanaland Protectorate, while

Position,
area,
boun-
daries.

to the south the Limpopo River is the dividing line between Rhodesia and the Transvaal Province of the Union of South Africa.

General
physical
condi-
tions.

The whole of Rhodesia forms part of the great South African plateau, which extends northwards from within a short distance of the coast on its southern, eastern, and western sides, beyond the region of the great African lakes, whence issue the great rivers of Africa, the Congo and the Nile. Naturally, the height of a plateau which covers so immense an area varies considerably; in Rhodesia the ordinary level is from 3,000 to 5,500 feet above sea-level. The existence of this great expanse of high country is a fact of the utmost importance, especially in its effect on climate. While Rhodesia lies wholly within the tropics, its range of climates is in general similar to that of the warmer parts of the temperate zones; very large portions of it are thus suited to European colonization. There is much evidence to prove that in Southern Rhodesia Europeans can follow their ordinary occupations over long periods without injury to health, and that European children born in the country thrive and attain a healthy maturity.

Rhodesia cannot be termed a mountainous country, although it is abundantly furnished with ranges of hills and contains much broken country. The greatest heights lie along the eastern border, where there is a well-defined series of mountain-ranges, running north and south and practically forming a continuation of the Drakensberg Mountains of the southern colonies. In parts these mountains reach a height of upwards of 8,000 feet, but in general their summits vary from 4,500 to 6,000 feet. Except along the eastern border of the country, altitudes of more than 5,500 feet are very rare.

Rivers
and river
basins.

Apart from the eastern mountain-range the principal divides run :

1. Along the border-line of Rhodesia and the Belgian Congo.

2. Parallel to the long axis of Lake Nyasa at a distance of roughly 50 miles from this axis.

3. North-east and south-west through Southern Rhodesia.

Of these, (1) divides the basin of the Zambezi from that of the Congo, (2) the Zambezi basin from the Lake Nyasa basin, and (3) the basin of the Zambezi from those of the Sabi and Limpopo Rivers.

The Zambezi is incomparably the greatest river of Rhodesia, and the part of Rhodesia lying within its basin must amount to at least two-thirds of the whole territory. ^{The Zambezi and its basin.} Nevertheless, in common with most other African rivers, it suffers from not being navigable in the commercial sense, a defect which accounts for the fact that it is only since the middle of the nineteenth century that the geography of this region has been unfolded to the civilized world. It is only up to Tete, a Portuguese settlement and government centre some 250 miles from its mouth, that the Zambezi is navigable, and then only for small shallow-draught steamers. Its total length is 1,700 miles. Yet, although the Zambezi thus occupies a humble place in the list of the great rivers of commerce, it exerts a fascination over the imagination which few of these are able to exercise. For it includes in its course a ledge over which the whole volume of the stream, at this point over a mile in width, falls sheer into a chasm 370 feet below—the famous Victoria Falls, discovered in 1855 by the great African traveller and missionary, David Livingstone. Above the Falls, the river, studded with numerous islands of vivid green, its waters moving slowly forward to take their great leap into the depths of the gorge, reminds one of the calm surface of a lake; below, the wild whirl of rushing waters hurling themselves furiously against the perpendicular walls of the Boiling Pot give to the traveller an unfading sense of gigantic force. Out of the Boiling Pot emerges an unfathomed torrent, no more than five-and-twenty yards wide at the point of exit, racing madly between the magnificent cliffs of the Batoko gorge; and it is not until the 40 miles of this gorge have been passed that the normal appearance of a river with broad, gently flowing stream and low shelving banks is regained.

Chief
tribu-
taries.

As has been said, the Zambezi and its tributaries drain by far the greater part of the surface of Rhodesia. The most important tributary is the Kafue, whose sources lie on the frontier of the Congo State, and whose basin includes the greater portion of the central districts of Northern Rhodesia. The other tributaries of importance on the northern bank are the Loangwe and the Shiré, the latter of which is of considerable commercial importance, as it forms in part the highway by which the highlands of the Nyasaland Protectorate are approached. On the south bank the surface waters of Southern Rhodesia are borne to the Zambezi by the Gwaai, the Sanyati, the Hunyani, the Mazoe, and a number of smaller streams.

Other
rivers.

The only other rivers of importance in Southern Rhodesia are the Sabi, which receives the waters of the southern half of the eastern and central districts, and the Limpopo, which has a large number of tributaries on its northern bank, and by their agency drains the southern districts of the territory. Few of these streams, however, flow for more than six months in the year, as the rainfall in this region is light and as a rule extends over a season including only about four months out of the twelve.

The rivers of Northern Rhodesia, apart from the Zambezi and its tributaries, are connected with the lake-system of Central Africa. The chief of these are the Chambezi, which issues from the mountain ridges extending between Lakes Tanganyika and Nyasa and flows into Lake Bangweolo, and the Luapula, which carries off the surplus waters of Lake Bangweolo to the lower level of Lake Mweru, whence in turn it flows again in a northerly direction, eventually being known as the Congo.

Geology
and
scenery.

A geological survey of Southern Rhodesia was initiated in the year 1910, and there are in existence accounts of the geological formations in which the various metalliferous mines of the country are found. The field is, however, so wide, and the quantity of work done relatively so small, that any account of Rhodesian geology must be very incomplete for many years to come. To an unscientific observer the most prominent geological feature is the

large area of granite country. Here and there are immense rounded hills, sometimes very steep, sometimes sloping gently, composed of unbroken granite masses; more widely distributed are the gigantic boulders piled high and perilously balanced, which give to much of the scenery a characteristic castellated appearance. The granite is coarse-grained and is usually grey, but occasionally has a slight yellowish or pinkish tinge. The most familiar instance of such scenery occurs in the Matopo Hills, where interest centres in the ring of massive rounded boulders which stand as silent sentries around the grave of Cecil John Rhodes, the founder of the country. In other parts of the country the schists afford the finest scenery, and display to the eye deeply serrated ridges of mountains and countless pointed peaks. Sandstones and basaltic rocks also occur, and in many parts of the country present scenery the principal feature of which consists of long flat-topped hills. The magnificent gorge of the Zambezi River below the Victoria Falls is cut in basalt. Most of the gold mines of the country are found either in the schists or in a younger sedimentary formation of banded ironstone or conglomerate. The mode of occurrences of the gold is mostly that of quartz veins lying in these or other formations of a metamorphic character. Occasionally, however, quartz veins containing gold are found in a granite contact.

In a territory which extends over so many as fourteen degrees of latitude it is natural that considerable varieties of climate occur. In general, however, such variations are less than might be expected, and the climate of Rhodesia is largely dependent upon three factors, all of which apply very generally, although in varying degrees, over the whole country. These are :

1. The rainfall is seasonal, and the period during which rain falls regularly is from the middle of October to the middle of March.

2. The surface lies at a considerable elevation above sea-level, the average certainly not less than 3,500 feet.

3. The country is an inland one, no part of it lying within 150 miles of the sea.

Health.

As a result of these factors, the climate of Rhodesia is one which makes the country as a whole well suited for European colonization. The experience of twenty years since the occupation took place has proved that, with proper care and due observance of hygienic rules, Europeans can live healthy lives while following their ordinary occupations. It was not until after the end of the Matabele and Mashona wars in 1897 that European women settled in the country to any large extent ; but since then abundant evidence has accumulated to prove that the children of European parents can grow up as sturdy and sound in constitution as in more temperate latitudes. The most prevalent diseases of the country, viz. malaria, pneumonia, dysentery, and typhoid fever, may be guarded against by due attention to the laws of health and by taking advantage of the discoveries of science. Indeed, there would be every hope of eliminating entirely these diseases from the higher parts of the country, but for the fact that the native population, which very greatly exceeds the number of Europeans in the country, cannot be induced to observe ordinary sanitary precautions.

Sleeping
sickness.

There is no doubt that since the commercial exploitation of South Central Africa began, the dreaded scourge of sleeping sickness has been carried far to the south of its natural habitat on the shores of the great African lakes, and since the year 1910 the disease has in this way been found in Southern Rhodesia. It is, however, not likely that the sleeping sickness will become a matter of serious concern to Southern Rhodesia, for the fly (*Glossina palpalis*) which is the host of the germ of the disease, a near relative to the tsetse fly (*Glossina morsitans*), whose bite is so fatal to cattle and horses, is known to inhabit only certain definite areas in the lower river valleys ; and the removal of the native population from the zone of infection, where necessary, will be found efficacious in checking the spread of the disease, as has already been proved in Uganda. In certain parts of Northern Rhodesia

the disease is endemic, but although constituting a serious problem, it shows no alarming tendency to spread beyond its natural limits. There is also good reason to hope that medical science is rapidly approaching the discovery of an anti-toxin which will enable the disease to be eradicated successfully from persons actually infected.

The rainfall of Rhodesia, like that of the rest of the great South African plateau, is markedly seasonal, and although it is unusual for no rain whatever to fall during the five dry months of May, June, July, August, and September, yet the average quantity precipitated during this period is so slight as to be quite negligible in effect. As a rule also, the rainfall in April and October is very light; and in an ordinary season not less than 90 per cent. of the total occurs in the five rainy months, November to March inclusive. The amount of rain which falls varies greatly, in accordance with local conditions, but in general it is greatest along the eastern border of the territory, and grows gradually smaller to the west. In the eastern districts the average is probably 40 inches per annum; in the extreme western districts and in the southern part of Southern Rhodesia it is somewhat less than 20 inches.

In Southern Rhodesia, where the observations cover a wide field, the average rainfall over ten years is 28.5 inches per annum, and the average number of rainy days 71, the number of stations from which the figures are taken being 24.

As regards atmospheric conditions, barometric variations from day to day are much smaller on the African plateau than at low altitudes in the temperate zone. The extreme range of pressure is in most places less than three-quarters of an inch. The mean temperature in Southern Rhodesia is about 65° F., in Northern Rhodesia it is probably over 70°. The highest shade temperatures registered reach 115° in the low valleys, but at altitudes over 4,000 feet, 100° is very rarely recorded. The most remarkable feature of the climate to a visitor to the country is the very large amount of bright sunshine.

Other
climatic
condi-
tions.

Days on which the sun is obscured throughout the day are rare, except in hilly districts where mists are prevalent ; and through the dry months of winter the sky is frequently free from clouds for many days at a time. In general, the climate may be described as essentially an ' outdoor ' one ; and this quality is strongly reflected in the character of the native population, and even to some extent in that of Europeans.

Vegeta-
tion.

The general aspect of the surface of Rhodesia has already been lightly touched on in the description given of the general geological features of the country. Over the greater part of Rhodesia luxuriant vegetation and a very rich supply of indigenous trees add greatly to the charm of the scenery. Compared with the southern colonies of South Africa, Rhodesia is very heavily wooded ; but the majority of the native trees are stunted and gnarled, owing to the ravages of grass fires which from time immemorial have swept over the country, destroying the more delicate grasses and seriously thwarting the growth of the timber. The long droughts of winter and, in some parts of the country, the nearness of the underlying rocks to the surface, cause the trees to grow slowly and prevent their attaining to a great height. Naturally there are exceptions to a rule of this kind. Along the eastern border there are small patches of magnificent tropical forest, similar in type, although of comparatively minute extent, to the dense forests of Central Africa, and in certain districts of Southern Rhodesia, notably between Bulawayo and the Victoria Falls, and over a large portion of the uplands of Northern Rhodesia, there are numerous forest trees providing fine timber of the hardwood varieties. In contrast with the rugged grandeur of the Matopos, which convey a strong sense of desolation and eternal silence, are the richly wooded hills of the Selukwe and Umtali districts ; while in many other localities a further contrast is provided by long stretches of undulating country, the hollows filled with rich green and blue marsh grasses, and in certain seasons a great wealth of brightly tinted blue, purple, scarlet, and yellow flowers,

the uplands thickly clothed with stunted evergreen trees, or broad untilled lands clothed with tall prairie grasses waving rhythmically in the breeze.

One special characteristic of Rhodesian scenery not elsewhere usual in South Africa, is the magnificent colour-^{Early foliage.}ing of the wooded country in September, when the winter chill is past and the sap runs anew in the trees. Instead of the tender greens of the temperate zone, the young foliage assumes brilliant shades of yellow and red, and rich tones of brown and copper. The whole effect in a hilly, heavily-wooded country is superb, and neither the pen nor the camera can do justice to it. At the same season, weeks before the early rains begin, from the dry earth spring a great variety of bushes and wild flowers, many of the latter remarkably beautiful, but nearly all of them without scent.

As in the case of the geology of Rhodesia, so with its flora, a vast amount of work remains to be done before any approximately complete account can be given; nevertheless, in the realm of botany much enthusiastic work has been done by private collectors, and a great number of Rhodesian flora have been classified in the botanical museums of London, Cape Town, and Hamburg.

The advance of civilization has not yet robbed Rhodesia of a distinguished place among the chief big-game-hunting countries of the world. In Southern Rhodesia the advent of an energetic farming population has driven away great numbers of game from those parts of the country which are situated at high altitudes, or in the neighbourhood of towns and railways, but farther afield, and in the native districts, the sportsman may still encounter the elephant, the hippopotamus, the rhinoceros, the buffalo, the zebra, and the larger varieties of antelope, all of which are now practically extinct, except where carefully preserved, in the southern colonies. The lion and leopard still prowl around the cattle- and sheep-folds in remoter districts, and occasionally venture within close range of civilization. In 1911, for example a lion was shot in broad daylight within 10 miles of Salisbury, the

Fauna :
Big game.

capital ; and in 1909 a goods train on its way from the Victoria Falls to Bulawayo was derailed by a collision with an elephant.

Northern Rhodesia is still a great natural game-reserve, and the few hundred settlers who inhabit its vast spaces of over a quarter of a million square miles have not availed to check the increase of the game, nor to prevent its wandering at will over the length and breadth of the whole territory.

Antelopes. There are not less than thirty different varieties of antelope in Rhodesia, some of them comparatively rare, some found in large numbers in every part of the territory. Included in the latter category are the steenbuck, klip-springer, duiker, oribi, reedbuck, bushbuck, kudu, waterbuck, roan and sable antelope. The largest and most ox-like of the antelopes, the eland, is also found in considerable numbers, though not in all parts of the country, and may occasionally be observed grazing in herds of fifty or sixty. The springbuck, which further south still wanders over wide spaces of sparsely populated country in enormous herds, is not found at all in Rhodesia. Antelopes rarely seen in Southern, but not uncommon in Northern Rhodesia, are the sitatunga, puku, lechwe, impala, and gemsbok. In patches of forest, the diminutive bluebuck, hardly larger than a fox-terrier, is occasionally seen, and the stateliest of all African antelopes, the kudu, is still found in small herds of ten or less, within easy reach even of the towns at times.

Birds. Of the birds of the country the largest is the ostrich, which is strictly protected by law, although in Rhodesia it has not yet been found to thrive in captivity. From the large number of wild ostriches which may be seen at any time on the higher and flatter parts of the plateau of Southern Rhodesia, it cannot be doubted that the country is suitable for ostrich-farming ; and in course of time a closer study of the habits of the bird will eventually add ostrich feathers to the list of the commercial products of Rhodesia. Of other large birds, the eagle, vulture, stork, crane, and hawk are seen in large numbers and in

several varieties ; the secretary-bird is found everywhere, and may be seen stalking majestically over the veld in search of food. Of game-birds the chief are bustards (including two varieties of paauw and four of koorhaan), francolin (locally known as partridge and pheasant, through a fancied or partial resemblance to these birds), guinea-fowl, and sand-grouse, usually spoken of as Namaqua partridge. Of small birds there is a very large number of species, many of them very brilliant in colouring. The handsomest of all is that usually known as the blue jay. In the vleis small birds flitter in great flocks with ceaseless chatter, but little music ; and occasionally when enormous numbers of migratory snipe come down from the north the sportsman may have a very busy time there with his gun. The snipe do not, however, appear in large numbers every year, and it is perhaps only in one season in four or five that large bags may be obtained. The number of varieties of small birds inhabiting Rhodesia must be very large, and here again there is a virgin field at hand to the scientific naturalist. In one district alone, an enthusiastic naturalist has made a collection of between four and five hundred separate varieties.

Of other animal life there is no lack. The rivers, even Fish. those which do not flow all the year round, but become merely a chain of muddy pools towards the end of the dry season, have plentiful stocks of fish, and the larger ones are infested by the loathsome and dreaded crocodile. From a sportsman's point of view the most interesting inhabitant of the rivers is the tiger-fish, which weighs up to 13 or 14 pounds when full grown and in good condition, and when hooked will fight with all the gameness of a salmon. Jackals, ant-bears, badgers, meercats (the latter a close relation to the Indian mongoose), as ^{Small} mammals, well as the more dangerous varieties of wild vermin, inhabit the country in large numbers, but in all cases their habits are shy, so that they are not very often seen. In Southern Rhodesia the jackal is hunted by organized packs of hounds, as is the fox in Britain.

Of creeping things, snakes and lizards, worms and Reptiles.

beetles, there is a vast variety, and several varieties of snakes carry a very deadly poison. Besides poisonous snakes, the python, which seizes and kills its victim by constriction before swallowing it whole, is found, and occasionally pythons of great size, up to over twenty feet in length, have been shot.

Insects.

In addition to the parasites which feed on the blood in animals and human beings, Rhodesia has its full share of insect pests which annoy the agriculturist. Thanks to energetic measures of the various governments in South Africa, locusts are no longer the scourge that they were even ten years ago, and scientific research has done much to lessen the ravages of the various minute worms, beetles, blights, scales, and flies which attack crops and orchards in Rhodesia and throughout the Union of South Africa.

Economic Conditions

Mining :
Gold.

At the time when the British South Africa Company obtained its Royal Charter in the year 1889, the eyes of the world were already turning to the newly-discovered goldfield of the Witwatersrand in the South African Republic, and experienced gold-miners who were acquainted with the conditions prevailing on this field were already forming conceptions of the enormous influence which the mines of the Witwatersrand were to exert upon the gold production and the economic conditions of the whole world.

It was rumoured that further north, beyond the Limpopo, there were very large auriferous areas indicated in part by the numerous ancient workings which travellers and hunters in these northern regions had already traced. This fact, together with the brilliant results on the Witwatersrand, gave rise to a belief that the young Chartered Company would quickly attain to great prosperity through its ownership of the mineral rights in the new territory. Accordingly, when the pioneer column, having cut 400 miles of road from its base at Macloutsie, and having reached the spot where the capital of Rhodesia, Salisbury, now stands, was disbanded

in September 1890, its members dispersed at once to peg the mining claims to which their services entitled them, in high hopes of immediate success.

Time was, however, to prove that these hopes were over-sanguine. It was not until 1894 that the roar of mining stamps proclaimed loudly that gold was actually being produced. The discovery of 'payable' gold ore in reefs large and permanent enough to warrant exploitation, the work of development of the mines, and the transport and erection of the necessary machinery and equipment, had taken a longer time than had been anticipated. But unforeseen delays were not the only disappointment experienced in Rhodesian mining. Experience quickly showed that in a country of great distances and primitive means of transport, the cost of working the mines was very high; consequently, many of the early-discovered mines exhausted their most valuable chutes of ore in the effort to meet the costly conditions of working. Lack of knowledge of the local geological conditions and of the metallurgical processes necessary to secure a high extraction of the gold contents of the ores also proved a deterrent to success. Early failures.

In consequence of these drawbacks the vast majority of the mining ventures of Rhodesia languished, and many people concerned lost faith in the country from the point of view of mining. Later development. Gradually, however, conditions improved, the railway advanced, valuable experience was gained, mining was carried on upon a stricter business basis, and, best of all, a few really valuable mines were discovered. About the time of the close of the Boer War (1902), the performances of the Globe and Phoenix Mine, situated some forty miles north of Gwelo, and the Tebekwe Mine, near Selukwe, proved that gold-mining in Rhodesia was not necessarily a losing venture. Hope began to revive; and a new factor affording encouragement to the industry appeared when in 1904 the railway, on its way from Bulawayo to the Victoria Falls, reached the Wankie coal area.

Since that time the growth of the gold-mining industry

has been steady, and the output of gold has increased year by year with hardly a single exception (vide Table in Appendix). In the year 1907, the British South Africa Company, in view of the fact that a large proportion of the mining of the country was on reefs of narrow width and short length, not suitable to the operations of limited liability companies, gave more favourable terms to the small worker, accepting royalties on the gold produced in place of a definite share in a capitalized undertaking as formerly. This step immediately brought about a considerable increase in the number of small workers, exploiting their own properties or claims leased from companies. Again in 1910, a new phase of the industry appeared when, owing to one or two new discoveries of valuable mines, the interest of the outside world in Rhodesian mining was revived. This newly-roused interest brought in its wake an inflow of capital into the country, and while some of the ill-effects of a 'boom' with its subsequent stagnation and disappointments were experienced, yet a permanent gain accrued from the capital invested, and development of properties showing promise took place on a much larger scale than ever before. The result was that at the end of the year 1912 the accumulated ore reserves of Rhodesian mines, considering only ore fully developed and in sight, represented a value of at least thirteen million pounds sterling, which is equal to nearly five years' supply of gold, at the existing rate of production. This clearly foreshadows a very considerably increased output of gold in the near future.

Coal.

In addition to its gold ores, Rhodesia possesses several other important sources of mineral wealth, still for the most part undeveloped. The Wankie coalfield has been proved to extend over hundreds of square miles, and at its present rate of production, which is less than a quarter of a million tons per annum, would continue to supply the needs of Rhodesia for centuries to come. In a heavily-wooded country like Rhodesia, practically all domestic requirements and many industrial necessities are met by wood-cutting. In the neighbourhood of mines, the country

loses its beauty, through loss of its timber, and the woodman has to go continually further afield to supply the voracious appetite for wood-fuel of the furnaces of a large mine. Eventually economic considerations must compel mines, even those most distant from the collieries, to consume coal, and such processes can already be observed at work. There are indications that coal exists in large quantities in various districts both in Southern and in Northern Rhodesia, but up to the present the coal in other areas which have been prospected has given poor calorific values, and therefore no new coal mines have been established.

Copper ores have also been discovered in many parts of Copper. both the Rhodesias, and various copper properties are in process of development. The most important of these mines lie in the area under the control of the Tanganyika Concessions, whose operations also extend to the extreme southern districts of the Belgian Congo State; these are situated in the extreme north and west of Northern Rhodesia, and their remoteness has been a very serious handicap to their progress. Since 1910, however, the railway has advanced rapidly and has crossed the Congo border into Belgian territory; and in consequence development has taken place at a more rapid rate. In the future, and for a long series of years to come, the enormous extent of these copper deposits makes it inevitable that the copper from Northern Rhodesia and the southern Congo will exercise a great influence on the world's markets.

Among the other mineral ores of Rhodesia are large Other deposits of chrome iron at Selukwe, which are now pro-minerals. ducing several thousands of tons monthly; this mineral is used in the process of manufacture of steel when great hardness is required in that metal, e. g. for armour plates in naval construction. Other ores found in Rhodesia, used for a similar purpose, are the tungsten ores, scheelite, and wolframite; but these have been discovered only in small quantities. Silver and lead are found in considerable quantities in conjunction with gold in the mines of

the Umtali district of Southern Rhodesia. In Northern Rhodesia there are wonderful deposits of ore containing large percentages of lead and zinc at Broken Hill, which was, up to the year 1909, the terminus of the railway; but the problem of separation of the two metals on an economic basis of profit remains unsolved. Various discoveries of tin ore have been made since the year 1910 in Southern Rhodesia, but no definite mine has yet been opened up; a similar remark applies to diamonds, although very promising deposits or fissures of characteristic African diamondiferous ground have been discovered in at least two districts. Asbestos is being worked in the Victoria district.

Altogether, Rhodesia is undoubtedly a highly mineralized country; and, with advancing knowledge of the geology of the country, it is probable that a prosperous future as a producer of gold, coal, the base metals, and possibly diamonds, is in store ¹.

Stock-
raising.

While the mineral exploitation of Rhodesia on an increasing scale of importance can be predicted as a strong probability, its future as an agricultural and still more as a stock-raising country can be regarded as a matter of certainty. The greater rainfall, richer soil, and less frequent frosts enjoyed by Rhodesia in comparison with the provinces of the South African Union, leave no doubt on these points. The country is especially favourably situated in regard to stock-raising, for the winter frosts

¹ Mineral output of Southern Rhodesia :

Year ended December 31,		<i>A. Gold.</i>	<i>B. Other minerals.</i>
		£	£
1902		686663	—
"	"	828220	10115
"	"	969287	50540
"	"	1449984	72125
"	"	1985100	102160
"	"	2178886	137119
"	"	2526006	149804
"	"	2623708	180498
"	"	2568198	222929
"	"	2647896	242863
"	"	2707369	257230

Total value of gold obtained in Southern Rhodesia from the beginning of the industry to the end of the year 1912, £22,500,000 nearly.

are never so severe as to destroy entirely the nutritive value of the dry grass, while the returning warmth of the sun enables the young grass to spring forth much earlier than farther south, where hard frosts prevail for from two to four months of the year. The greater rainfall of Rhodesia gives it a further advantage, for in general the cattle do not need to go so far afield in search of water to drink during the dry months.

At the present time the comparatively short period during which any considerable portions of the veld have been systematically grazed, has not permitted the farms to be stocked with well-bred varieties of sheep and goats, but already it has been proved that the veld of Rhodesia is admirably adapted to cattle, even of the more finely-bred and carefully-nurtured kinds. In course of time the breeding of pure-bred sheep and goats will follow, as the coarser wild grasses are stamped out by the systematic grazing of cattle. The greatly increased production of maize within the last few years has already called attention to the fact that the surplus may be more profitably employed in feeding pigs than for export; thus, in course of time, Rhodesia is likely to become important as a bacon-producing country. As already mentioned, the country is the home of great numbers of wild ostriches; and this fact offers a new field to the scientific stock-breeder.

As regards agriculture, the principal crops raised are maize, tobacco, ground-nuts, oat hay, potatoes, and native grains consumed only by the indigenous population and known to Europeans as ruquesa or rapoko, munga or inyouti, and kaffir corn or mabele, all of which are varieties of millet. In a few places plantations of coffee and of rubber are in process of arriving at maturity; and there are very promising indications of the suitability of a great portion of the valley of the Kafue River for cotton-growing. Other crops either entirely new to the country or hitherto not successfully cultivated in it, are being grown experimentally under the eye of trained scientific agriculturists; of these the most important is wheat, which in

the past has often proved a failure owing to the attacks of rust, even when grown as a winter crop under irrigation. A great advance has, however, been made in the direction of producing a rust-resistant type of wheat, and when this is perfected farmers will be enabled to grow wheat as a summer crop on unirrigated land ; when this stage is attained there can be no doubt that wheat will be very largely grown, to supply the country's requirements and probably also for export.

Maize.

At present the staple crops grown by European farmers are maize and tobacco, the former in all parts of the country occupied by Europeans, the latter localized in certain districts around Salisbury, Bulawayo, and Umtali. The consumption of maize in Southern Rhodesia is very large owing to the fact that this grain is the principal food of natives on the mines. In good seasons since the year 1910 there has been a small surplus available for export, and experiment has shown that Rhodesian maize can be disposed of at a fair profit in the markets of London, Antwerp, and Hamburg. Since this time the number of farmers in Southern Rhodesia has increased very largely ; at the end of the year 1912 there were about 2,000 occupied farms, a remarkably large number in view of the fact that the total European population at that date did not exceed 30,000. The surplus of maize, after local requirements are met, will therefore grow much larger, and will be disposed of, partly by increased export, partly by being used locally to feed stock, especially pigs.

Tobacco.

Experiments in the growing of tobacco, both of the Virginian and Turkish varieties, have been carried on for several years, but it is only since 1910 that the production of leaf on a commercial scale has begun. The quantity produced has increased very largely since the latter date, and the greater part of the crop is disposed of annually by means of an auction sale held in the government tobacco warehouse in Salisbury. The quantity thus disposed of in 1913 was considerably over a million pounds of leaf ; and as the prices realized year by year give a very

satisfactory profit to the grower, the amount of land under tobacco crops is certain to continue to increase. The requirements of the South African market are not yet fully met ; when this point is reached, Rhodesia will be a competitor in the world's markets, especially in Virginian tobacco, the highest grades of which the country has already proved its ability to grow.

As a fruit-growing country Rhodesia is still in an early Fruit. stage of development. At the higher altitudes apples, pears, plums, peaches, grapes, nectarines, and apricots of good quality are produced ; but as regards grapes and stone fruit, at least, it is not likely that its products will influence outside markets, for these fruits are not at their best in climates in which they ripen while exposed to heavy rains. At the lower levels tropical fruits, including mangoes, pine-apples, and bananas, do well. The country shows most promise in citrus fruits—oranges, lemons, and the like. Test shipments to England have been made for some years, and have been very favourably reported on. The area suitable for the growing of citrus fruits includes practically the whole country, and the orchards are being rapidly extended. As the trees come to maturity export on a large scale will begin, and since the Rhodesian fruit will arrive in the European markets at a time when supplies are scanty, the prospects are exceedingly good.

Manufactures, apart from such as are required to place Manufac-
tures. the agricultural products of the country upon the local markets, can hardly be said to exist. The immediate future of the country in this respect is not very promising, on account of the high cost of living which makes the wages of skilled artisans necessarily high. Further, the small amount of traffic on the railways of the country makes freight charges on imports very heavy, a fact which does not encourage the hope that manufactures dependent upon the importation of raw materials can thrive in the country. At present the economic interests of the country can best be served by development of its natural resources in minerals, agriculture, and live-stock, by efforts to lower the cost of living by means of

reduction of railway rates, and by maintaining the scale of import duties on necessities at the lowest possible level. A policy of high protective duties, except upon such articles as tobacco, would, at this stage of the country's progress, be highly detrimental.

Railways. No other country in the world possesses so great a length of railways in proportion to the number of its civilized inhabitants. At the end of the year 1912 there were no fewer than 2,400 miles of railway open for traffic, nearly the whole of which are of standard South African gauge (3 ft. 6 in.). As has been stated, railway rates over the system are exceedingly high; a fact which is not very remarkable in a country which possesses a mile of railway for every twelve European inhabitants. Moreover, it has to be remembered that in the early days of the territory it was possible to raise capital for railways only by means of guaranteed debentures, and that for many years the guarantors were called upon to provide the debenture interest out of their own resources. Consequently the sums of money spent on maintenance and on the provision of new rolling-stock, workshops, and suitable stations and offices were very small. But since the year 1910 a great change has taken place, and the railways of Rhodesia now show a very handsome surplus, after all charges, including interest on debentures, are fully met. The surplus funds are being used to pay off old liabilities and to provide for long-deferred expenditure on the objects mentioned.

It is thus reasonable to suppose that within a short period the railway authorities will be enabled to make very large reductions in their tariff; and there can be no doubt that the adoption of this course would be greatly to the benefit of the country and eventually of the railway companies themselves.

Development of the S. Rhodesian system The Rhodesian system of railways is naturally of very recent growth. The first line opened was that which reached Bulawayo from the south in 1897; the second connected Umtali, the Rhodesian border town, with the Portuguese seaport of Beira in the following year, and in 1899 this

section of railway was extended to Salisbury. In 1902 the connexion between Salisbury and Bulawayo, a distance of over 300 miles, was completed; the construction of this section made one continuous length of railway, extending from Cape Town to Beira, a distance of over 2,000 miles. Shortly after this the construction of the northern railway from Bulawayo was taken in hand, and the Victoria Falls were reached in 1904; in the following year the magnificent bridge across the Zambezi gorge below the falls was built, and the railway was carried further north, reaching Broken Hill in 1906, and Sakanian on the Congo State border towards the close of 1909. Since the year 1902 no fewer than ten branch lines of railway, varying in length from a few miles to upwards of 100 miles, have been constructed in Southern Rhodesia, and the building of additional branch lines to meet the requirements of the mining and agricultural industries continues almost without interruption.

Southern Rhodesia is thus very well supplied with railways; at present there is only one district (Melssetter) in which any appreciable number of European settlers is living at a distance of over 100 miles from the nearest point of railway.¹

The administration has constructed a number of main Roads and paths. roads which run through farming and mining districts and link them with the railway; large sums of money are expended annually upon these. Owing to the great

¹ Principal railway sections, including branch lines, with lengths, are :

	<i>Miles.</i>
Vryburg—Bulawayo	588 ^b
Bulawayo—Salisbury	301
Salisbury—Beira	374 [†]
Bulawayo—Victoria Falls	288
Victoria Falls—Congo Border	507
<i>Branch Lines .</i>	
Bulawayo—Gwanda	103
Gwelo—Umvuma	49
Gwelo—Selukwe	23
Salisbury—Lomagundi	78
Salisbury—Mazoe—Shamva	80
Short branch lines	34

^a 511 miles in Bechuanaland, &c.

[†] 202 miles in Portuguese East Africa.

expense which would be involved the rivers are not bridged, but 'drifts' are constructed which enable wagons to cross them at all times except for short periods, usually not more than a day or two in length, when the streams are in flood. When the soil is sandy, as it is over great stretches of granite country, the roads are very heavy in the dry season, and in the heavier soils, deep mud and occasional 'washaways' of the road make travelling difficult during the rains. In the unpopulated districts where there are no roads, winding native paths, barely a foot in width as a rule, supply the means of communication, and the lonely trader in remote districts in replenishing his stocks, depends upon the services of native carriers who may be seen in long waving lines, marching at a steady pace along the footpaths, each with his load of 50 or 60 pounds weight balanced on his head or carried on one shoulder with the aid of a stout staff which passes over the other shoulder and helps to support the load.

In former days the slow-moving ox was the chief agent in transport work on the roads, and on a good level road a span of sixteen oxen would cover about 15 miles a day, with a load of ten thousand pounds weight on the wagon. In hilly country the load would have to be reduced by almost one-half. At the present time, the ox has largely been replaced by the donkey and the mule, partly on account of the greater speed of the mule, but mainly because of the greater immunity to disease of both mule and donkey. It has been proved beyond doubt that ox-wagon transport is largely responsible for the spread of cattle diseases, and hence in districts where an outbreak has occurred such transport along the roads is immediately prohibited, the prohibition remaining in force for a long period, as a rule at least two years.

Railways,
roads, and
paths in
N. Rhodesia.

As regards transport facilities Northern Rhodesia compares very unfavourably with its neighbour. It possesses only one line of railway, which runs from the Zambezi (Livingstone) to the border of the Belgian Congo (Sakania), passing along the divide for the most part, and therefore doing little to assist the development of the more fertile

parts of the country. The other approach to Northern Rhodesia, from the south-east, via the Portuguese port of Chinde, the Zambezi and Shiré Rivers, and the Nyasaland Railway, is helpful to the north-eastern districts, but this chain has one very weak link in it, namely, the Shiré River, which falls very low at times, so that steamers have great difficulty in making their way up.

For the rest, transport in Northern Rhodesia is almost entirely by means of native carriers, since the presence of the tsetse-fly prohibits animal transport over long distances, the fly-belts recurring continually. It has been suggested that motor cars and vans and road engines might be used with advantage, especially in the north-eastern parts of the country; but the roads which have been constructed between the various government centres are merely paths, suitable only for pedestrian traffic. Great expense in road-building and in the erection of bridges would therefore be necessary to carry out the suggestion. Railways seem to be the only solution of the transport question in Northern Rhodesia; but it will need someone with the faith, energy, and resources of a Rhodes to provide this solution.

As regards other means of communication, Southern Rhodesia possesses an efficient postal, telegraph, and (in the towns) telephone service. In Northern Rhodesia the only telegraph lines are that which follows the railway entering the country at the Victoria Falls, and the African Trans-Continental Telegraph, which, starting from Umtali, in Southern Rhodesia, is carried through the eastern part of Northern Rhodesia as far as Lake Tanganyika. The telegraph system of Rhodesia includes altogether about 8,000 miles of line and 150 offices.

Posts and
Tele-
graphs.

Social and Political Conditions

There are in Southern Rhodesia at the present time about 30,000 European settlers, and about 750,000 natives of Bantu race. In Northern Rhodesia the whites number no more than 1,500 souls, while the number of natives,

Popula-
tion.

which has been ascertained with approximate correctness by the census of April 1911, is more than 800,000. So great a disproportion between Europeans and natives would naturally lead one to suppose that Rhodesia as a whole should be ranked among the large native dependencies of the Empire, its European population consisting merely of temporary residents drawn thither on trading, plantation, or mining enterprises, or in missionary, official, and police capacities. As regards Northern Rhodesia, such a view is probably correct; for the country belongs geographically and climatically to Equatorial rather than to South Africa, and its suitability for genuine European colonization—to say the least—remains to be proved.

European
settle-
ment.

In the case of Southern Rhodesia the position is far different. It is true that the European population is small but it is increasing steadily, and a substantial proportion of the increase is due to natural causes, that is to say, to the excess of births over deaths. Moreover, many of the European settlers are entirely of the permanent colonizing type, for there are in the country no less than 2,000 farms occupied by Europeans. Geographically, too, the greater part of Southern Rhodesia belongs to the South African plateau, and the low-lying, broad, hot, unhealthy valley of the Zambezi forms the natural frontier zone between the temperate and equatorial regions.

Urban
and rural
popula-
tion.

The proportion of rural to urban population is often a good test of the genuineness of European colonization in a new country, and in this respect Southern Rhodesia already compares favourably with other South African and with the Australian colonies. There are only three urban centres of 1,000 or more European inhabitants in the country, viz. Bulawayo (5,200 inhabitants), Salisbury (3,600 inhabitants), and Umtali (1,000 inhabitants). If the smaller centres be added, the urban population may be computed at 12,500; but even so it is exceeded by the rural population by about 40 per cent. The fact is due to the nature of the industries of the territory, which are of the mining and agricultural, not of the manufacturing type; and while it is true that a gold-mining

population is essentially nomadic in character, yet in Southern Rhodesia a very large proportion of the persons employed in the mining industry are permanently settled in the country, and bring up their families in it; their wanderings take them from one mining camp to another, but do not necessitate their leaving the country.

The native population belongs almost entirely to the great Bantu family. The present inhabitants have entered from the north and west by means of a long succession of waves of immigration, the most recent of which, affecting the high plateau of north-eastern Rhodesia, did not come to an end before the beginning of last century. The chief tribes in Southern Rhodesia are the Matabele and Mashona, whence come the names of the two main divisions of the territory; the most important peoples of Northern Rhodesia are the Barotse, who inhabit the upper Zambezi valley, the Mashukulumbwe of the Kafue valley, and the Awemba, the most virile of the tribes living on the north-eastern plateau.

Traces of earlier occupations of the country abound throughout Rhodesia, and controversies as to the date and origin of some of them are being carried on. These traces include (1) ancient rock-paintings and carvings, (2) ancient mines, (3) ancient ruins.

The paintings and rock-carvings are widely distributed and are undoubtedly the work of the almost extinct race of Bushmen who are regarded as the aboriginal inhabitants of South Africa. Hundreds of specimens are known to exist, the subjects being almost invariably men and wild animals, often in separate units, sometimes in spirited groups representing scenes of the chase. Bushmen were entirely nomadic in habit, and their sole means of livelihood was hunting. A few still exist in the Kalahari Desert, west of Rhodesia and Bechuanaland; these live in the old primitive fashion on the proceeds of their hunting.

Much more awe and mystery surround the ancient buildings of Rhodesia which occur only south of the Zambezi, the chief among them being found at Zimbabwe

(Victoria District), Khami (near Bulawayo), Ndhlo-ndhlo (near the Shangani River), and, in widely distributed fragments, in the Inyanga district. The ruins at Zimbabwe are specially notable, and are on a larger scale and in a better state of preservation than any others. They have been very fully described (see bibliography below), and although they cannot be definitely traced to Asiatic builders, the alternative explanation that they are of purely Bantu origin, and probably not more than 500 years old, does not seem altogether satisfactory.

Ancient
mines.

Ancient workings of gold and copper mines have been found in great numbers, and some of them are of considerable length and of depths in extreme instances of 100 or 120 feet. In all probability the unsolved problem of their origin is closely wrapped up with that which concerns the ancient ruins of Rhodesia, in which indeed numerous ornaments and occasional ingots of gold and of copper have been found.

Native
character-
istics.

The most marked difference between the native tribes is in their languages, the divergences between which are very considerable, although a native knowing any one of these languages can quickly master any of the others if thrown into a suitable environment. In structure and idiom the various languages bear a strong resemblance to each other, but their vocabularies differ very widely. In outward appearance, too, especially in the manner of their ornamentation of face, head, and body, there are great differences; but in the ingrained habits and superstitions and ceremonies which dominate the native mind, the ethnologist finds the resemblances much more striking than the differences. In all parts of Rhodesia the influence of government and of missionaries is at work to combat the grosser native superstitions and practices; but it is found that the native, when once removed from European influences, very quickly relapses into his former state. The chief defects of the native character are indolence, moral (not physical) cowardice, and above all sensuality; for the rest the native is a good-natured, improvident, very sociable person, somewhat philosophical in tempera-

ment when there is no question of angry spirits, witchcraft, or sexual jealousies to darken his outlook ; but when roused by emotions proceeding from these causes, he is capable of the wildest acts of unreason and cruelty.

On the whole, the Rhodesian native is wonderfully ^{Native adminis-}submissive to European control, although many of the ordinances of government appear to him incomprehensible and almost all of them unnecessary. In general it may be said that the administration of native affairs, apart from the government's insistence on the payment of tax, is sympathetic, and the officials in charge of districts are allowed to make decisions in accordance with native law and custom where such are not manifestly contrary to morality. The tribes which formerly held the most warlike reputations, such as the Matabele and the Awemba, now live at peace in contact with others whom formerly they plundered at will. In the case of the Matabele this result was not achieved without serious fighting in the wars of 1893 (in which their king, Lobengula, perished, and at the conclusion of which their country was taken over by the British South Africa Company) and of 1896-7. The latter was a rebellion against European control, and extended also to Mashonaland, where, indeed, it proved more difficult to quell than in Matabeleland itself. Apart from these two wars, the native administration of Rhodesia has been singularly free from armed conflicts, punitive expeditions, and the like ; and provided that he is punctual in his payment of hut-tax, the native may continue, if he pleases, to live the old tribal life remote from European influences, and with a feeling of security never enjoyed in the days when native chiefs went to war at their pleasure and found it necessary to indulge in recurrent spectacles of horror and cruelty in order to maintain their prestige.

The government of Rhodesia is in the hands of the ^{The B.S.A}British South Africa Company, and is based upon the ^{Company.}provisions of the Royal Charter of 1889, as amended and amplified by the Orders in Council of 1894, 1898, and 1908. The original term of the Charter, 25 years, expires in

1914, but the Charter may then be renewed by the Imperial Government. The executive powers granted in the Charter are exercised by an Administrator appointed by the Company with the approval of the Crown. The Administrations of Southern and Northern Rhodesia are entirely separate, and imperial interests are watched over by a Resident Commissioner, stationed at Salisbury, the capital of Southern Rhodesia, who is responsible to the High Commissioner for South Africa.

In Northern Rhodesia there is no legislative council, and the territory is administered under English law. Up to 1894 the administration was carried on from Nyasaland, by the Imperial Commissioner, and the Company paid annual subsidies to defray the cost of administration. In 1894 the Company established its own administration, which later it was found necessary to subdivide into two, namely, North-Eastern and North-Western Rhodesia. In course of time the administration was consolidated, all the native tribes being gradually brought under its influence, with the result that in 1910 it was decided to reunite the separated administrations. Since 1911 there has been only one administration of Northern Rhodesia, the head-quarters of which are fixed at Livingstone, on the Zambezi River, within a few miles of the Victoria Falls, the point at which the railway enters the territory.

Partial
representative
government

Southern Rhodesia has since the year 1899 enjoyed a system of partial representative government, and the Legislature has included elected members since that date. The proportion of elected to nominated members has gradually been increased, and the elected members were in 1913 in a majority, 12 out of 18, in the Legislative Assembly. The Company, however, still possesses a right of veto over the financial proposals of the Legislature, and the Secretary of State for the Colonies, advised by the High Commissioner, has the power of veto on general legislation. Formerly there were separate administrations in Matabeleland and Mashonaland, but these were amalgamated in 1898, and Salisbury in Mashonaland then became the capital of Southern Rhodesia. Bulawayo,

the former capital of Matabeleland, still remains the most important railway and business centre and the largest town in Southern Rhodesia. The territory is administered under Roman Dutch law, and prior to the establishment of a local Legislature in 1899, the bulk of its laws were taken *en bloc* from the Statute Book of the Cape Colony.

Northern Rhodesia, with its huge undeveloped area and only one European to every 200 square miles, remains a native territory. Its conditions are primitive, and the tribal system is hardly encroached on. There is nothing approaching a town, in the European sense, in the whole territory. Here and there is a small centre of European influences, government, mining, railway, or missionary, but these are very few. Southern Rhodesia, on the other hand, is rapidly approaching the time when it will be ready to take the status of a self-governing colony. Its towns are equipped with more public conveniences than any of similar size in Europe. Bulawayo and Salisbury possess public supplies of water and electric light, broad paved streets fringed with growing avenues of trees, public libraries and museums, hospitals, theatres, public halls and gardens, numerous churches and schools, and all the advantages which it is in the power of enterprising municipalities to create. Other smaller centres are similarly equipped on a more modest scale, and are administered by urban and village management boards.

There are almost 3,000 European children in the schools of the territory, and education is efficiently provided from the kindergarten stage up to the threshold of the university. Agriculture is fostered by means of government experimental stations and laboratories, in which agricultural experiment, and bacteriological and veterinary research are carried on by staffs of trained experts. Posts, telegraphs, and telephones carry civilization into remote districts, and newspapers are published in half a dozen centres and circulated throughout the country.

The European population is eminently British in general

N. Rhodesia.
Education.
Culture.

type and imperialistic in sentiment. About 35 per cent. of the population consists of persons born in the British Isles, some 50 per cent. are of South African birth, and the remaining 15 per cent. come from various countries of Europe or from other British colonies. About 20 per cent. are children born in Rhodesia itself. Persons of South African Dutch origin, including those born in Rhodesia, form about 15 per cent. of the whole, while of those born outside the Empire. Jews and Greeks form a considerable majority.

The civilization of Rhodesia is thus of a true British type, modified by local circumstances, the chief of which are climate, the call for pioneer enterprise, and the presence of a large indigenous population in a state of barbarism. This great native population is at once the greatest of the country's natural resources and the most insistent of its problems. In general, attempts to europeanize the native do not penetrate far below the surface ; and in the process the sanctions of native life tend to be destroyed without being adequately replaced.

In spite, however, of all problems, disappointments, depressions, and losses, the tone of life in Rhodesia is exuberant, full of youth and hope and activity—to some extent, no doubt, materialistic, but not more so than a country dependent very largely on gold-mining might naturally be expected to be. Yet in a true sense, the ' vast and brooding spirit ' of its founder still presides over the destinies of Rhodesia, communicating his magnificent vision and large ideals to the people, urging them to higher achievement, and imparting something of his indomitable courage and energy. The conditions of the territory call aloud for population, capital, civilizing influences ; the genuine Rhodesian, with the ideals of Cecil John Rhodes still inspiring him, believes steadfastly that all these things will in time be forthcoming, and presses on towards their attainment.



PLATE XI. VICTORIA FALLS, ZAMBEZI

(Lit. L. Commission for North Africa)

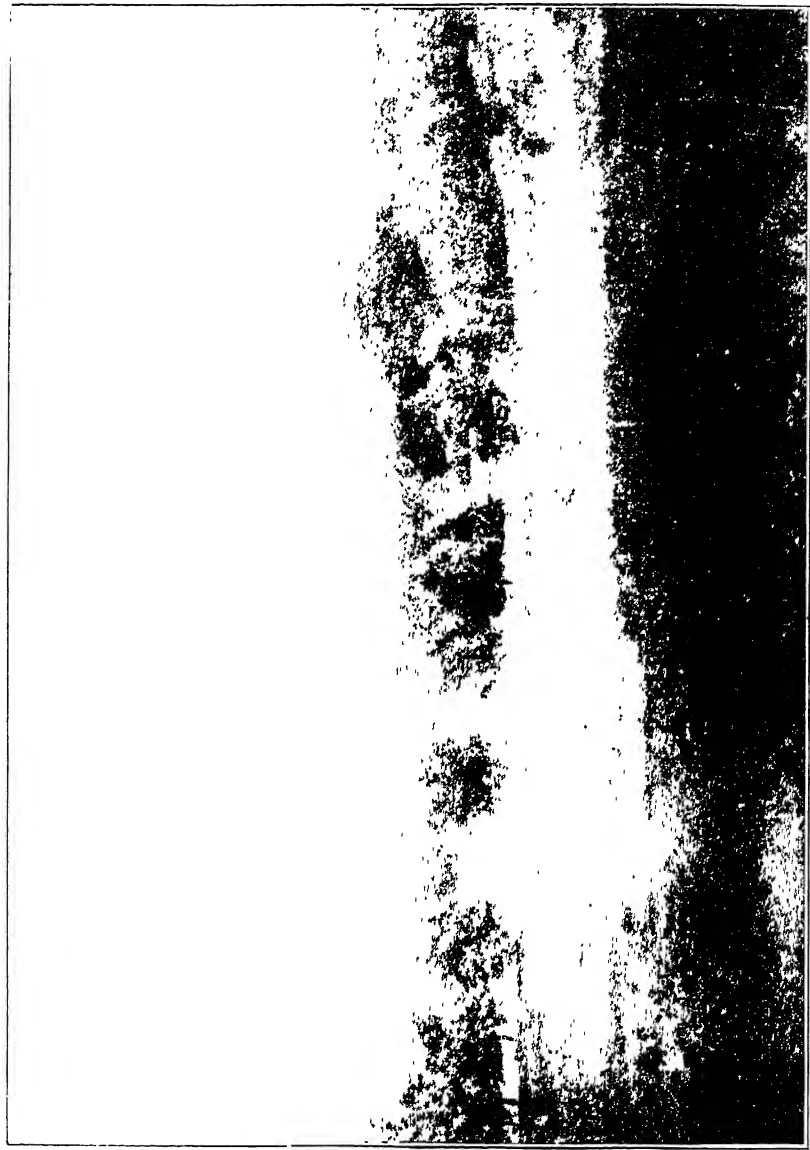


PLATE XII. BLANTYRE, NYASALAND
(Crown Agents for the Colonies)

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CHAPTER X

NYASALAND

BY J. B. KEEBLE

Natural Conditions

NYASALAND is a small narrow strip of country about 150 miles distant from the east coast of Africa, of an area of approximately 39,800 square miles, lying between 9° 45' and 17° 15' S. lat., and 33° and 36° E. long. It has for boundaries on the east and south Lake Nyasa and Portuguese East Africa, on the west Northern Rhodesia and Portuguese East Africa, and on the north German East Africa. The country comprises (1) that territory which extends from the western shore of Lake

Nyasa to the basin of the Loangwa River ; (2) the region lying between the watershed of the Zambezi and Shiré on the west, and Lakes Chiuta and Chilwa and the River Ruvo on the east.

Relief.

The general nature of the country is mountainous, an almost continuous chain of mountains extending from north to south and forming a series of table-lands. The lowlands extend along the shores of the lakes and rivers. The principal ranges of mountains are as follow.

1. Mlanje, situated in the extreme south-east of the Protectorate, is a great table-land of about 200 square miles at an altitude of 6,000 feet, from which several granite peaks rise to a height of over 9,000 feet.

2. The Shiré Highlands, an irregular chain of mountainous country situated east of the Shiré River above its confluence with the Ruvo, extend for 90 miles from north to south and 20 to 30 in width, varying from 3,000 to 7,000 feet in altitude.

3. The Kirk Range, situated on the west of the Shiré and approaching the south-west end of Lake Nyasa, attains an altitude of 7,000 feet.

4. The Angoniland Plateau rises west of Lake Nyasa ; its peaks range between 5,000 and 6,000 feet.

5. The Nyika Plateau is situated at the north-west end of Lake Nyasa.

6. On the north-west edge of the Protectorate are the Nkonde Mountains, and

7. Between Nyasa and Chiuta, Mangoche Mountain reaches an elevation of 4,700 feet.

Geology.

The rock formations, which make up the surface of Nyasaland, comprise three great groups, an igneous, a sedimentary, and a metamorphic. The surface of Nyasaland is composed chiefly of metamorphic gneisses and schists, including (a) black and white rock, which is composed of layers of black mica, hornblende, white felspar quartz, (b) a basic hornblendic gneiss, (c) a graphitic gneiss, (d) a garnetiferous gneiss, (e) mica and talc schists. Iron ores, ilmenite, magnetite, and crystalline limestone all occur in seams in the gneisses of different

localities. These gneisses and schists form the basement of the country and through this basement igneous rocks have been intruded, and probably at the same time pegmatitic veins and seams were forced along the planes of the gneiss and now form seams of quartz, felspar, and muscovite.

The sedimentary rocks occupy a comparatively small part of the country. They may be grouped as follow.

(a) Recent gravels, marls, and alluvium, occurring chiefly near the shores of Lake Nyasa and along the river courses.

(b) Coal-bearing formation of Karroo age. A series consisting of an assemblage of conglomerates, pebbly sandstones, sandstones, shales, coal, mudstones, lime-stones. Fossils are not abundant, but *Glossopteris* has been identified.

(c) Older beds of possibly Cape age. Found only in one corner of the Protectorate, consisting of a great thickness of quartzites, conglomerates, greywackes, shales, and flags.

The intrusion of igneous rocks mentioned above, and the presence of basaltic lavas and basalt dykes in certain localities, show that at some periods volcanic action manifested itself in Nyasaland; at the present day there is no manifest action.

The climate of the highlands differs considerably Climate. from that of the lowlands of the Shiré Valley and Lake Nyasa. The temperature of the former ranges from a maximum of 97° F. in the hot season to a minimum of 40° in the cold season, the annual rainfall varying from 40 to 100 inches. In the lowlands the temperature is moderate for the cool season, but rises to 120° in the hot season; the rainfall does not exceed 35 inches. The seasons may be roughly classed as rainy and dry, the former lasting from November to March, during which period the temperature is high. The lowest temperature is felt in July to August. On some of the highest parts, for example, the Nyika Plateau, frost is sometimes experienced at night.

Health
of Euro-
peans.

The climate of the Protectorate cannot be said to be altogether healthy for Europeans. A certain amount of malarial fever must be expected. The severest form is commonly known as 'blackwater' fever, the others not being as a rule dangerous to life. Blackwater fever is generally recognized to be of malarial origin, though this point has from time to time been disputed. It almost invariably occurs in those who have previously suffered from repeated attacks of malarial fever; and quinine, not necessarily in large or oft-repeated doses, is held by many to be the chief provoking cause. There are several residents in the country who have had two or more attacks of blackwater fever; there would therefore appear to be some constitutional tendency to this type of fever. The mortality from this disease, however, has greatly diminished within recent years, owing to the adoption of a different method of treatment and the withholding of quinine, which it was the custom formerly to give in large doses during an attack. In 1895-6 there were no less than sixteen deaths from this disease alone; in 1908-9 there were five, and the death-rate amongst Europeans throughout the Protectorate from all causes for the same year was 28·57 per thousand in place of about 70 per thousand a few years earlier. But for the various forms of malarial fever, Nyasaland may be said to be a healthy country. European children seem to thrive fairly well, but experience clearly shows that they require to be removed to a temperate climate after they have reached the age of three or four years. European women appear on the whole to enjoy better health than the men, probably owing in a large measure to their leading a less exposed life.

Medical
super-
vision and
diseases of
Natives.

The native population comes under the surveillance of a staff of medical officers by means of hospitals and dispensaries and by district travelling. All natives are impregnated with malaria, but they are not subject to the severest form known as blackwater. Sleeping sickness is present in a certain area on the Lake shore, and all that can be effected by means of segregation, removal of villages

from the fly area and medical treatment, is being done to prevent the spread of the disease. Outbreaks of small-pox occur from time to time, but the systematic vaccination of the population has led to a notable decrease in the number of outbreaks. Pellagra, leprosy, and syphilis are found in cases presenting themselves for treatment. Ankylostomiasis is prevalent and a systematic campaign has been undertaken against this insidious disease. Natives suffer considerably from pneumonia in the cold weather. Phthisis has been introduced from South Africa by natives returning from the mines.

The progress of hygiene and sanitation is slow; the native is naturally suspicious of European methods altogether unknown to him, and prefers the treatment of the village medicine men. He is gradually, however, accepting the benefits of European medicine and treatment.

Nyasaland has for its eastern boundary Lake Nyasa, ^{Hydro-}the third largest lake in Africa—a deep basin of fresh ^{graphy:} water 360 miles long and 15 to 50 miles wide, lying at an ^{Lake} altitude of 1,645 feet above the sea. Its greatest depth is ^{Nyasa.} 386 fathoms. Its principal affluents are the rivers Songwe, Rukuru, Bua, and Lintipi on the western coast, but they are of no great size. At the southern extremity its outlet is the River Shiré. Navigation is everywhere practicable, but owing to the existence of sand-bars most of the harbours can only be entered by vessels of light draught. On the western shore the harbours are small and much exposed to north or south winds. On the eastern shore the Portuguese harbour of Mtengula is good. Islands are few, of small area, and practically barren.

Lake Chilwa, or Shirwa, lies south-east of Nyasa on ^{Other} the Portuguese boundary. It is dependent on rainfall, ^{lakes.} and does not exceed 100 square miles in the height of the rainy season, but is considerably smaller in the dry season. The water is brackish. Chiuta, a fresh-water lake a few miles north of Chilwa, is 30 miles long and 2 to 8 miles wide. It is the source of the River Lujenda, which flows north. Lake Malombe lies a little south of

Nyasa, but is now little more than a broad channel of the River Shiré.

Rivers.

Nyasaland is a well-watered country although its rivers are small. The chief river is the Shiré, which has its source at the south end of Lake Nyasa and follows a southerly, south-westerly, and southerly course until it joins the Zambezi 110 miles from the sea. It is navigable from Lake Nyasa for some 70 miles in the wet season. Onward for 70 miles it has a series of falls and rapids which render navigation impossible, but after that distance it is again navigable for the rest of its course. Its chief affluent is the Ruu, which rises on Mount Mlanje and joins the Shiré at Chiromo 200 miles from the coast. The Lintipi, Rukuru, and Songwe rise in the mountains west of Lake Nyasa and feed that lake. All these rivers are fed by many small streams, a great number of which exist through the whole year and not only during the rainy season.

Vegetation.

Vegetation throughout almost the whole of Nyasaland is profuse. In the low-lying shores of the lakes and rivers tall swamp grasses, reeds, palms, &c., are common, while on higher levels, scrub, thorny bush, and small trees are plentiful, in parts as dense thickets, in other localities as sparse woods. The country is well timbered, but forests of large timber are few, the growth consisting chiefly of small hardwood trees. The notable exception to this is found in the cypress forests of the Mlanje Plateau. They provide excellent timber, much used for buildings. Other large timber trees are found on the banks of streams and rivers, at an elevation varying from 1,500 to 3,500 feet. There are about eighteen varieties, the chief of which is *Khaya senegalensis* (African mahogany). In mountain ravines and valleys the growth is extremely dense; palms, tree-ferns, and rubber-yielding Landolphins are found in these conditions and a great variety of small plant-growth. Forests of bamboo are abundant on hill slopes. High table-lands are for the most part sparsely wooded. Ornamental trees and plants are common in many beautiful varieties.

Animal life in Nyasaland is abundant, although big Animals. game is disappearing from the neighbourhood of civilization. Certain species which are common to South and British East Africa are absent from Nyasaland. e. g. the ard wolf, caracal lynx, long-eared foxes, mountain asses, oryx antelopes, the gazelles, jerboas, ant bear, secretary vulture, and ostrich. Nyasaland also differs from West Africa in not possessing any form of anthropoid ape, several monkeys, some of the smaller antelopes, and the *Dorcattherium*. The points of resemblance with West Africa are the presence of a peculiar civet cat, one or more genera of bats, a colobus monkey, and among birds the black and white vulturine fishing eagle. Nyasaland offers a good field to the sportsman for elephant, buffalo, rhinoceros, zebra, hippopotamus, antelope (greater kudu, sable, eland, nyala, &c.), bush pig, wart-hog, &c. Smaller animals of the order Rodentia are abundant, also bats, shrews, and in a few districts also the scaly ant-eater.

Of the Carnivora, the lion, leopard, several species of cat, the cheetah, hyena, genet, mongoose, jackal, hunting dog, weasel, badger, otter, are all fairly common.

Bird life is abundant and includes species of crow, Birds. starling, orioles, weavers, waxbills, sparrow, buntings, wagtails, thrush, warblers, swallow, woodpecker, cuckoo, turacos, parrots, hornbills, kingfishers, owls, anseres, cranes, herons, storks, flamingoes, cormorant, plovers, woodcock, snipe, and pigeons. Eagles, hawks, vultures are well represented; also gallinaceous birds, such as guinea fowl, francolin, and quail.

The reptiles of Nyasaland include the crocodile, tortoise, Reptiles and lizards, chameleons, snakes of several varieties. The non-venomous African python is found near rivers and swamps. Of venomous species the puff adder and cobra are the most common. Frogs are abundant, also scorpions, centipedes, millipedes, ticks, leeches, earthworms. Of insects there is more than an abundant supply of all kinds and sizes. Many are very injurious to human beings and animals, e. g., mosquito, tsetse fly, ticks.

Economic Conditions

Agri-
culture.

Nyasaland is essentially an agricultural country, and its progress as regards both trade and the social life of the people is dependent upon the success achieved in the cultivation of valuable economic products, both by Europeans and by natives.

It must be remembered that Nyasaland is not a white man's country in the accepted sense of the term, as the climate forbids manual labour in the fields, consequently settlers employ large numbers of natives for the cultivation of their crops. It is argued that to encourage natives to plant cotton or tobacco on an extensive scale results in a diminution of the labour-supply and a consequent curtailment of the acreage planted and the resultant export. This view should not be accepted. An ample number of labourers can be engaged in districts which, for climatic reasons, are unsuitable for the cultivation of economic crops, and planters who make a point of housing and feeding their native labourers on generous lines experience no difficulty in this respect. Moreover, it is common practice for all the members of a native's family to assist in the fields, thus freeing the male heads to obtain lucrative employment elsewhere during the planting season. There is, therefore, full scope for agricultural development by both races, and in many respects their progress is interdependent and closely associated.

Nyasaland is rich in possibilities. Large tracts of land are suitable for the cultivation of tobacco, cotton, tea, maize, rubber, chillies, rice, &c., and the success achieved by European planters, combined with the free life, is attracting an increasing number of settlers. Land can be leased from either the government or the land-owning companies which obtained large concessions of land from the native chiefs before the establishment of the government. To obtain a satisfactory start, and as an assurance against an initial bad season, a capital of £1,500 to £2,000 is necessary, but an intending settler would be well advised to investigate thoroughly the question of

employing agricultural machinery which would necessitate a heavier capital outlay. The works of reference quoted in the annexed bibliography contain full information on the subject.

With regard to native agriculture, every encouragement is given by government to foster cotton-growing, and the results obtained have justified the policy. Selected seed is issued free of cost, and the establishment of cotton markets in numerous centres during the harvest, where the crops are sold by auction to European and Indian purchasers, ensures an adequate return to the grower for his labour.

Considering the difficulties experienced in transporting crops, the successful enterprise of the European settlers is astonishing. The construction of the railway between the River Shiré at Port Herald and Blantyre has proved a boon, and the extension of the line southward through Portuguese territory to the coast at Beira and northward to Lake Nyasa will undoubtedly result in increased agricultural activity and progress in every respect, and lead to the profitable export of crops such as maize and rice, in large quantities.

Cattle are found throughout Nyasaland and thrive well in most districts. Native-owned cattle may be roughly described as of two kinds, the humped species, and those which have no doubt descended from South African cattle which have no hump. The best districts for cattle are the high-lying plateau west of the Lake and of the River Shiré, generally known as Angoniland. Here, at an elevation of from 4,000 to 5,000 feet above sea-level, large herds are owned by natives. On the shores of Lake Nyasa, however, and on the Shiré River itself, cattle thrive well. The total number of head of native-owned cattle is approximately 47,000. There is no doubt that when railway communication with the sea coast and Lake Nyasa is established, the stock-raising industries, both European and native, will grow rapidly both as regards the export of live-stock and skins and hides. European owners of cattle have imported pedigree stock from Europe

with a view to grading up local herds as regards both milk-giving and beef-producing qualities. The native sheep is the usual fat-tailed species, and imported rams and ewes have hitherto been unfortunate.

Mining.

A survey was conducted by expert mineralogists in 1905-8, and printed reports can be obtained from the Director of the Imperial Institute, South Kensington, under whose supervision the mineral survey was conducted. Coal and iron appear to offer a good field for exploitation in the near future, while the deposits of mica and plumbago are receiving attention from several syndicates. Prospecting has received spasmodic attention, and information is to be obtained from the Director of Mines, Zomba, and also from the British South Africa Company, London, which possesses the mineral rights over practically the northern half of the Protectorate. Although the unexpected happens in regard to the discovery of deposits, it may be safely stated that Nyasaland has no rich mineral wealth as compared with other African possessions.

Manu-
factures

Owing to the fact that Nyasaland is an agricultural country, little is practicable in regard to the establishment of manufacturing industries. A large number of cotton ginneries with hydraulic pressing machinery, to prepare the crop for shipment to Europe, have been erected in various districts, both by independent planting concerns and by the British Cotton-Growing Association. The Imperial Tobacco Company own and work a large plant at Limbe for handling and baling the tobacco crop. With these exceptions it may be stated that no factories worthy of mention are in existence.

Trans-
port.

The main artery to the coast is a river dependent for its existence, except during the rainy season, on Lake Nyasa, the rise and fall of which is governed by the supplies it receives from the rivers running into it from the surrounding ranges of hills. If to this condition be added the fact that Chinde, the seaport, possesses no harbour or anchorage for even transport tramps, necessitating the haulage of all cargo in sea lighters to Beira, 120 miles distant, some idea of the difficulties of transportation

will be gathered. When the rivers Zambezi and Shiré are low, cargo and passengers have to be conveyed in barges and houseboats over about 80 to 100 miles of the journey to the Protectorate, at Port Herald, the southern terminus of the railway. The completion of the projected extension of the railway to the Zambezi and thence to Beira is the only possible solution of the transport question, and until this is accomplished larger quantities of merchandise and products cannot be handled.

The Protectorate is well equipped with roads suitable for Roads. ox-wagon traffic, enabling planters to transport their produce to rail and steamer. A macadamized road, fit for mechanically propelled vehicles, has been constructed from Blantyre via Limbe to Zomba (43 miles), and additional roads of this description, which admit of the employment of motor and steam vehicles, and serve as feeder roads to the railway, are being built each year. On roads where 'belts' of tsetse fly are encountered, precluding the employment of oxen, carts drawn by natives are used. Light rickshaws are generally used throughout the Protectorate for passenger traffic, and owing to the excellent surface of the roads, motor bicycles afford a favourite mode of progression.

Transport on Lake Nyasa is conducted by small steamers. Inland Regular voyages round the lake, for the transport of navigation. produce, passengers, &c., are made by the transport firms engaged in the trade. The vessels employed on the Shiré and Zambezi rivers are of the flat bottom, stern-wheel, shallow-draught type, well suited to the navigation of African rivers.

The external trade of Nyasaland (import and export), Trade. not including goods in transit to neighbouring territories, increased during two decades from £66,702 in 1893 and £188,755 in 1903 to £446,125 in 1912. In 1912 the goods imported for home consumption, consisting chiefly of soft goods, hardware, provisions, alcohol, arms and ammunition, amounted to £247,548, and the exports reached a total of £198,577. The transit trade during 1907-12 increased from £23,000 to £44,000 (see p. 523).

Trade conditions are so closely related to transport facilities that a continued improvement is dependent entirely on improved means of communication, for the purchasing power of the people is regulated by agricultural activity, which in turn is governed by the question of transport. As pointed out in a previous section, the agricultural outlook is bright, and the same may be said in regard to trade.

To reach the native consumer traders establish groups of small stores on the thoroughfares running through every district. There is thus a store within easy reach of practically every village of any importance, and as the stock of goods kept comprises every conceivable article within the range of the native's fancy, his needs are well catered for, and from a trading point of view the system lends itself to developing his requirements. This business is chiefly in the hands of Indian traders, who, as a general rule, purchase their stocks from European wholesale houses in the country. The practice of peddling goods from village to village by licensed hawkers is also followed. The native is quick to assimilate the possibilities of commerce, and his adaptability to trading was soon evidenced by his efforts to compete with the Indian small trader. Markets for the sale and barter of foodstuffs and other articles of commercial value, on the lines of the now old-fashioned country village markets, are held in most of the busier centres, and the system, eminently suitable for the disposal of produce, has not only taken a firm hold, but is of educational value.

Social and Political Conditions

People. The population of Nyasaland is European, Asiatic, and native, the last constituting by far the greater portion. Of Europeans there are roughly 800, including government officials, planters, and traders, their wives and children. The Asiatics number 500, and consist, for the most part, of Indian traders. The native population numbers approximately 1,000,000 and is of Bantu-negro stock, with an intermixture of Bushman-Hottentot type.

For so small a country the tribal differences are many, and the characteristics of each strongly marked, although the present tendency is to intermingle and reproduce a more homogeneous type.

The finest people, both physically and mentally, are the ^{The Yaos.} Yaos; they inhabit the Shiré Highlands and the south-eastern and south-western shores of Lake Nyasa, but are not indigenous to the country, having come originally from the coast during the last century. They settled among the Anyanja, and have dwelt side by side with them since. They are dignified, reserved people, capable of learning quickly and thoroughly. Physically they are well built and athletic, and make good soldiers, servants, craftsmen, and workers generally.

The Anyanja are a large and important group, comprising the Atonga, Ahenga, and Achewa. They inhabit ^{The Anyanja.} the western and south-western shores of Lake Nyasa and the Shiré Highlands. The Atonga approach the Yaos most closely in moral standing and physical well-being. Taken as a whole and compared with the Yaos the Anyanja are unstable in character, less eager and less capable of learning, and with less pride of birth. Nevertheless they are a peaceful and useful people and provide good material for work and development.

The northern and north-western shores of Lake Nyasa ^{The Wankonde.} are inhabited by the Wankonde. They are a pastoral people owning cattle in large numbers; they are prosperous, but lazy, incompetent, and dirty, with no desire to be anything different from what they are.

Another low-caste tribe represented in Nyasaland is ^{The Anguru.} the Anguru (and Alolo). These people inhabit the south-east corner of the Protectorate, and within recent years have crossed over from Portuguese territory. They are a nomadic people and attach themselves usually to Yao or Anyanja chiefs rather than settle in communities of their own, thus laying themselves open to contempt from other tribes. They are employed by Europeans as field labourers, but so far have not shown power to perform work of a higher standard.

The Achikunda. The Achikunda are a tribe of people inhabiting the Lower Shiré. They are quiet peaceful folk, with marked tribal characteristics, engaged chiefly in boating, fishing, and agriculture.

The Awemba. The Awemba belong properly to North-eastern Rhodesia, but a portion of them inhabit the north-west border of the Protectorate, and many seek service as soldiers and craftsmen.

The Angoni. Inhabiting Angoniland and the highlands north-west of Lake Nyasa are a people of Zulu descent, the Angoni. They were driven north across the Zambezi by tribal warfare in South Africa, and after much wandering they settled in the highlands above mentioned. They are a fierce, warlike people by nature, but the enforced peacefulness of past years has somewhat modified this characteristic. They are chiefly concerned in agricultural pursuits.

Before the advent of the British government, inter-tribal warfare was rife, and caused great loss of life and desolation. Progress has been remarkable; having once accepted the inevitable peaceful régime of the British, the tribes settled down to that quiet development and friendly intercourse with each other which has made their government a comparatively easy matter to the British.

Government. During the period 1891–1904 the Foreign Office controlled Nyasaland, but on April 1, 1904, this work was transferred to the Colonial Office. The administrative area includes a concession at Chinde, leased from the Portuguese Government, on which merchandise for British territory is transhipped free of all Portuguese duties. The system of government has evolved from the vesting of authority and power by the Crown in one officer—a commissioner and consul-general—to the form common in most Crown colonies. Executive control is vested in the governor-in-council, an official body consisting of the governor, deputy-governor, treasurer, and attorney-general: legislative power is vested in a council consisting of the executive body and three unofficial

members nominated and appointed by the Crown. There is no popular nomination or election of members.

Native administration is controlled by the executive council with the assistance of a body of residents and assistant residents. For administrative purposes the Protectorate is divided into fourteen districts, each of which is administered, both as regards law and the collection of revenue, by a resident and one or more assistants. Each officer acts, under warrant, as the magistrate of the district. By continual travelling through his district, and by patient hearing of all cases brought by natives, the resident keeps in close touch with his people, and the executive is thus enabled to feel the pulse of native life throughout the country. In the early days of the country's history a native was unable to obtain redress for a grievance or wrong unless he had the ear of his chief or headman, the way to which meant, needless to say, a payment or service of some value. This system was speedily abolished by the government, and the accessibility and impartiality of a magistrate has endeared the system to the native's inherent love of and respect for justice. Independence and individuality have grown to such an extent that it has become necessary to provide for this spirit by instituting a system of native councils of chiefs and headmen, with well-defined magisterial powers, who will work in conjunction and under the close supervision of the district resident and magistrate. This procedure should control the new spirit, guide it back into a modified form of communal representation free from bribery and corruption, and invest the appointments in question with dignity and status worth acquiring.

In 1902 the 'British Central Africa Order in Council' and the 'Eastern Africa Protectorates (Court of Appeal Order in Council' were passed. The former created a High Court of British Central Africa (now, since the Nyasaland Order in Council, 1907, the High Court of Nyasaland) and conferred on this court full jurisdiction, civil and criminal, over all persons and all matters in the Protectorate. The Order in Council also authorized the

Adminis-
tration.

System of
courts.

creation of courts subordinate to the high court, and these courts were created accordingly by a local ordinance which constituted a system of courts inferior to the high court, presided over by district and assistant magistrates.

The subordinate courts are divided into district and sub-district courts exercising civil and criminal jurisdiction over non-natives, and district native and sub-district native courts with jurisdiction over natives. An appeal lies from a sub-district to a district court and similarly from a sub-district native court to a district native court, and from any of these courts, either with or without leave, to the high court. The high court, in addition to its appellate jurisdiction, exercises a power of confirmation of all sentences over a certain amount, and has further ample powers of intervention which it may exercise as required.

The Eastern Africa Protectorates (Court of Appeal) Order in Council, 1902, created an appeal court for this Protectorate as well as for East Africa and Uganda. This court sits at Mombasa, East Africa, and an appeal lies from this court to the Privy Council.

A complete system of protectorate courts exists with their respective appropriate jurisdiction clearly defined and limited by Orders in Council and the ordinances made thereunder.

The law
of the
Protec-
torate.

It is laid down by the British Central Africa Order in Council, 1902, that the civil and criminal jurisdiction of the high court (and consequently of the subordinate courts) shall, so far as circumstances admit, be exercised in conformity with the substance of the law for the time being in force in England, and with the powers vested in and according to the procedure and practice observed by and before the courts of justice and justices of the peace in England according to their respective jurisdictions and authorities, except so far as may be otherwise provided by law. The same order in council provides that 'in all cases civil and criminal to which natives are parties, every court (a) shall be guided by native law so far as it is applicable and is not repugnant to justice and morality

or inconsistent with any Order in Council or Ordinance or any Regulation or Rule made under any Order in Council or Ordinance ; and (b) shall decide all such cases according to substantial justice without undue regard to technicalities of procedure and without undue delay '.

The substance of the law for the time being in force in England means the Common Law, the principles of equity, and such statutes as are deemed to be of general application in force at the time of the making of the order in council. In addition to this body of law there are the old regulations and rules made under the Africa Order in Council, 1889, that order itself, which is expressly kept alive by the British Central Africa Order in Council, 1902, in so far as it does not conflict with the latter order in council, the orders in council of 1892, 1893, 1898 (two), and, lastly, the local ordinances made by virtue of the order in council of 1902, and the rules made under these ordinances.

As laid down in the order referred to above, regard is paid to native law and custom where not repugnant to justice and morality. The most common instance in which English law is modified by native law is to be found in the treatment of adultery cases, which, in accordance with the native ideas on the subject, are treated criminally. In other cases, where it is impossible to follow native law and custom by reason of its being repugnant to justice and morality, evidence of a well-established custom is always taken into account as a mitigating circumstance, which, though not justifying the crime committed, affords some excuse and is held to reduce the degree of criminality involved. Court procedure is provided for by local ordinances.

Nyasaland is fortunate in possessing a population that Culture. has peacefully accepted the cessation of internecine raids and tribal disturbances and adopted the diametrically opposed line of life offered by industry and education. Remarkable results have followed the burden of administration accepted by the government in 1891 and paid for by the British public since that date. There is now

every reason to think that the funds expended will be a good investment for the Empire, not only financially, but by the addition of a million natives who are gradually becoming useful citizens and turning their energy to the development of their own country.

Educa-
tion.

A young native of Nyasaland is a most promising subject educationally; he is quick to learn, and in a few years he is fit for an office stool, to be a typist, teacher, mechanic, builder, road engineer, hospital assistant, or for some other useful occupation. There is no doubt that he will become as competent for higher posts as his West African brothers. It is true that his avidity and passion for education, evinced by other races all over Africa, are due to an inherent commercial instinct to better his lot and satisfy the created desire for creature comforts. He is fast leaving behind the old savage conditions for conditions little less baffling. This progress is, of course, most noticeable in districts nearest European centres, but it is radiating throughout the country.

Educational effort has been carried out entirely by the various missionary societies, and the success achieved is due in no small measure to their good organizations and practical propaganda. There are over 1,500 schools in the Protectorate, the majority of which are 'village schools' (i.e. schools in charge of native teachers superintended by Europeans from the head-quarters of the missions), at which 120,000 natives receive instruction, the average attendance being 84,000. Native artisans are trained in the industrial schools attached to the head-quarters of most of the missions. The government makes an annual grant of £1,000 in aid of primary education, which is allocated, under certain conditions, to those societies desirous of participating.

Hygienic
conditions
and habi-
tations.

A good deal remains to be done in regard to improving hygienic conditions in villages and domestic life generally. This subject is dealt with both by government and by missionary societies, and a diminution of disease traceable to insanitary causes may be anticipated.

The more advanced natives are building a type of

house superior to the common village hut, in many cases of brick with iron or grass roof, and their eagerness to become freeholders of land for development and subsequent bequest to their children is a clear indication of a general desire to break from the old communal life and tenure of gardens. Facilities are offered by government to bona fide applicants, with due safeguards in regard to alienation or sub-letting the land.

Paganism is fast disappearing. Owing to the energy Religion. of the numerous missionary societies established in the Protectorate and the activity of Muhammadan teachers and emissaries, practically the whole population is reached; indeed, the rivalry is so keen that societies are endeavouring mutually to define and keep boundaries of influence. The native has a strong natural leaning to religious life, and when taken up it plays a commanding part in his calm life, which is unruffled by the conflicting emotions experienced by a European. This leaning is particularly noticeable in some tribes more than others, e.g. the Atonga and Ankhonde, and a traveller in the West and North Nyasa districts would be astonished at the continual hymn-singing and other religious exercises practised by these people. A great attraction to missionary work is the industrial and educational training offered by the societies, and this branch of the work is of great value to the country.

Muhammadanism is practically confined to the districts bordering the south-eastern shores of Lake Nyasa. The Yaos form the greatest numerical strength of this persuasion, but the profession of this religion and the practice of its rites is regarded more as a cult and a social status. For this reason it is a serious competitor with Christian doctrines.

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Maps.—A recent map of the Protectorate can be obtained from the Director of Public Works, Zomba. Sectional maps of any district on a large scale can also be obtained from the same department.

¹ Obtainable from the Government printer, Zomba.

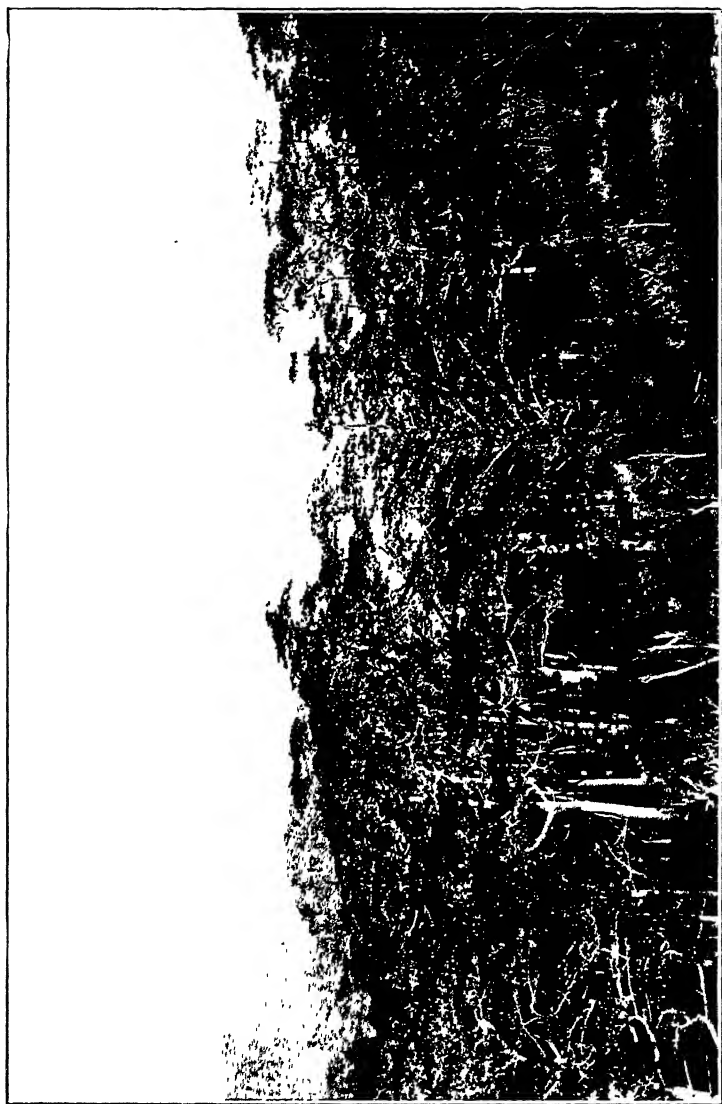


PLATE XIII. MLANJE PLATEAU, NYASALAND
(Crown Agents for the Colonies)



PLATE XIV (a). BANANA GROVE, UGANDA



PLATE XIV (b). IN THE TORO FOREST

(Sir H. H. Johnston)

EAST AFRICA

CHAPTER XI

ZANZIBAR

BY SIR HARRY H. JOHNSTON

THE Zanzibar Sultanate and Protectorate consists of two small islands—Pemba and Zanzibar—and an islet, Tumbatu, off the equatorial east coast of Africa, between south latitudes $4^{\circ} 8'$ and $6^{\circ} 30'$. The total area of the two islands and their adjoining islets is 1,020 square miles (Pemba 380 square miles, Zanzibar 625 square miles). Tumbatu, just north of Zanzibar, is about six miles long by one broad, and there is one other islet as large, also off the north end of Zanzibar, three others off the southwest coast, and nine islets off the west coast of Pemba. Zanzibar¹ is the more important as well as the larger island of the two. It is 47 miles long and about 20 miles in breadth, and though consisting largely of coral rocks on the surface, has also low hills of hard red clay (deeply tinged with iron) rising to altitudes between 400 and 500 feet. Its average distance from the mainland of East Africa is 20 miles. There formerly belonged to this same political division the island of Mafia, some distance to the south and situated much closer to the mainland. This has long been detached from Zanzibar, and forms part of German East Africa, but it is geologically an outlying member of the Zanzibar system, which is one, apparently, of some antiquity of origin, as is shown by the somewhat peculiar fauna and flora of Zanzibar

Natural
condi-
tions.

¹ Zanzibar is a softening of the Persian and Indian combination Zanj-bar or Zeng-bar, from *Zinj* or *Zeng*, 'black man', and *bar*, 'country' or 'region'. The Bantu name of Zanzibar is *Unguja*, that of Pemba is *Mpemba*. The Arabs call Pemba Al-Khadra, 'the green'. The early Roman geographers alluded to the Zangian coast as Azania and Zingis; the Byzantines as Zingium; Marco Polo (who wrote of it from hearsay and confused it with Madagascar) as Zanghibar.

especially, and of Pemba in less degree ; that is to say, these two islands have been cut off from the mainland for a sufficiently long time to have developed features of their own, or have retained within their limits animals and plants which have become extinct in East Africa. The flora of Pemba and of Zanzibar includes plants and trees which are characteristic of the more western parts of Africa, and seem to be survivals in these islands of earlier days when a rich forest covered almost the whole of equatorial Africa. To obtain a closer correspondence with the flora of Pemba and Zanzibar, one has to travel as far west as the west shores of Tanganyika, Nyasa, or the Victoria Nyanza. Pemba is entirely of coralline formation ; that is to say, nothing but coral rock appears anywhere near the surface, even though it rises in height to as much as 600 feet above sea-level. It is covered with most luxuriant vegetation, the rainfall being very heavy, probably of an average of 85-90 inches per annum.

Climate.

The average rainfall of Zanzibar would not seem to be more than 65 inches, though this is occasionally exceeded by an excessive amount (97.9 inches in Central Zanzibar in 1899), and interrupted by slightly drier years, whereas the rainfall of Pemba is more uniform. The temperature of both islands is always very warm, and the atmosphere being usually moist, the climate of both is distinctly trying to Europeans, even when every precaution regarding hygiene is taken. For instance, cool nights are rare, the temperature of the night being not much less than that of the day. There are two seasons which are associated by the natives with the direction of the wind. That of the north-east monsoon, when a steady wind sets in across the Indian Ocean from the north-east, begins in November, and gives place in April (the rainiest month) to the south-west monsoon, which blows from the direction of the African continent, and is the cooler of the two winds. The hottest time of the year is probably during the blowing of the north-east monsoon, and the coolest between June and September. The annual temperature of Zanzibar is about 80° F., and that of Pemba perhaps

2° higher. The months in which the rainfall is heaviest in Zanzibar are December, April, and May, and the only approach to a really dry season is between June and August. But in Pemba, though the rainfall is heaviest between November and May, rain may be looked for in any month of the year. There are no rivers or streams in either island. Pools of water lie in hollows of the coral rocks and are frequently renewed by rain. The water supply of the inhabitants is mainly derived from shallow wells.

The surface of Pemba is covered with dense vegetation, *Flora* though much of the splendid forest has been cut down to make way for clove plantations. In the early part of the nineteenth century the forests of Pemba almost rivalled those of West Africa in their luxuriance, and contained many West African forms of trees and plants. Likewise Zanzibar was once covered with dense forest (containing copal-gum-producing trees), which has now almost entirely disappeared owing to the extension of cultivation. So many plants have been introduced from India, Madagascar, and even from tropical America, that at first a botanist traversing both islands, if unaware of the history of Zanzibar, would be puzzled at finding such an assemblage of examples of the world's equatorial flora. This fact, however, greatly adds to the interest and beauty of both islands, which have become in course of time, thanks to the Arabs, Portuguese, Indians, and British (notably the great Sir John Kirk, for many years British Agent and Consul-General in the Zanzibar Sultanate) two large botanical gardens, displaying a magnificent variety of palms, indigenous and exotic, of orchids, both terrestrial and epiphytic, and of many valuable food plants, both native and introduced. Hither was brought (to Pemba also) the clove tree from the Molucca Islands of the Malay Archipelago—indirectly, for it was actually procured from the French Mascarene island of Réunion in 1818 by an enterprising Arab. From India have come the mango and the mangostin; even the nutmeg has been introduced from the Banda Islands, cinnamon from Ceylon, the

duriān from the Malay Peninsula, the guava from the West Indies, and oranges and bananas from India and China. In the wild flora of the two islands, more especially Pemba, an interesting instance of affinity with West-Central Africa is the Oil palm (*Elais*).

Fauna.

The fauna of Zanzibar is continental ; that is to say, it includes mammals identical with those of the adjoining mainland of East Africa, though the bigger beasts are absent either through having been exterminated by man, or having died out in such a limited area. Nevertheless, they offer peculiarities in some cases showing that Zanzibar and Pemba must have been cut off from the continent for a considerable period. On Pemba Island, for example, there is a peculiar species of *Pteropus*, fruit-eating bat, whose nearest relations are in Madagascar. Peculiar to the island of Zanzibar are one species of monkey—the *Colobus kirkii*—and a Galago lemur. At one time it was believed that the pretty little antelope *Nesotragus moschatus*, found on the small islands off Zanzibar Harbour, was peculiar to Zanzibar, but it has since been discovered in the coast districts of the East African mainland. Besides the peculiar red Colobus monkey, there are Grivet monkeys of the East African type on Zanzibar Island. Hippopotami formerly existed on the sea-coast of Pemba and Zanzibar, but have long since been driven away by rifles. The East African bush pig—*Potamochoerus*—is found in both islands ; and on Zanzibar, serval cats, and possibly the African wild cat—*Felis ocreata*—still frequent the scrub and bush. There were crocodiles at one time to be found in the brackish swamps, and pythons still exist in the island. Most other snakes have been killed out. A prominent type of mammal in the city of Zanzibar are the ugly fruit-bats of the genus *Epomophorus*, which hang in colonies amidst the branches of great fig-trees and feed at dusk on the bananas of the natives' plantations. Although Zanzibar and Pemba swarm with mosquitoes, insect-eating bats are not as common as they should be. Porcupines are still found in the wilder parts of Zanzibar, and a few squirrels. The birds are chiefly those of the

East African mainland, but of course do not include naturally any of the large forms, such as the ostrich (except in a domestic state), the bigger eagles, or vultures. Guinea fowl of the genera *Numida* and *Guttera* are found in both Pemba and Zanzibar, together with a few francolins. The Java 'sparrow' has been introduced from Malaysia and has become a wild bird in Zanzibar. There are several species of beautiful sunbirds.

The first human inhabitants of Zanzibar were probably negroes, who came in course of time to be negroes speaking Bantu languages. But Arab settlement seems to be very ancient and to have commenced before the Christian era. Some form of Bantu speech was probably introduced into Zanzibar early in the Christian era, as the language of negro slaves from the mainland. Twenty or thirty years ago there was still lingering in the remoter parts of Zanzibar Island a people styled by the Swahili Arabs, Wahadimu, or 'those of ancient times',¹ who spoke a dialect containing a large admixture of Arabic and Persian words, but in other respects apparently related to the Bantu coast languages of British East Africa. It would seem as if in Zanzibar, or farther south, at Kilwa, had first been developed by Arab settlement that remarkable Lingua Franca of Eastern and Central Africa—the Swahili, a language which has since spread as the common speech of the coast people over the East African littoral from the Ruvuma River in the south to the Juba River in the north. Swahili (the name is a corruption of the Arab plural word Suahil, or 'the coastlands') is not only the easiest of the Bantu languages to learn, but in many respects has retained archaic features, and is an excellent introduction to the Bantu language family generally. Although the Arab tongue has not affected its grammar or structure in the least, a great many Arab words have

Ethnology
and
history.

Arab
settle-
ment.

¹ The Wahadimu were really the negroid descendants of the ancient Arab and Persian invaders of Zanzibar, as contrasted with the more recently arrived Arabs of Maskat, who had settled there after the expulsion of the Portuguese in 1698. The Wahadimu were and are still the principal cattle-keepers and herdsmen of Zanzibar Island. They also produce skilful carpenters and craftsmen.

been imported into its vocabulary, but in the process have been broadened with introduced vowel sounds, so that they are as easy to pronounce as the Bantu element of Swahili. It is possible that Zanzibar and Pemba were visited by Arab (Idumaeen, Sabaeen, Minaeen, Hadramaut) ships several centuries before the time of Christ, and soon afterwards by vessels from the Persian Gulf which coasted along the shores of Arabia and East Africa till they reached these conveniently situated islands. Zanzibar is obviously the *Menouthias*, *Menouthesias*, *Manutia*, of Greek and early Arab geographers, and under the first of those names is mentioned as an Arab trading station by the Greek pilots who compiled the *Periplus of the Erythraean Sea* about eighty years after the beginning of the Christian era. It is not improbable that before the beginning of the Christian era, or soon afterwards, Malays reached Zanzibar from the Maldive, Chagos, and Seychelles Islands; Malays who came from Sumatra and effected ultimately the colonization of Madagascar. A vestige of this Polynesian influence in Zanzibar remains in the shape of canoes fitted with outriggers, a type of vessel utterly unknown to the negro elsewhere, but recalling the outrigger canoes of Malaysia and Polynesia. Through Arab intervention a trade across the Indian Ocean sprang up between China, India, Persia, and Zanzibar in the early part of the Christian era, and this trade was in full swing at the beginning of the sixteenth century, when Zanzibar was reached by the ships of the Portuguese.

Portu-
guese
settle-
ment.

The Portuguese conquered Zanzibar and Pemba in about 1508 from the Arabs. These Arabs had immigrated from the Hijaz, Yaman, and the Persian Gulf, and subjected anew much of the East African littoral after the triumph of Islam, though the first colonies from Arabia and Persia were Muhammadan schismatics fleeing from religious persecution. There are buildings still existing in Zanzibar city which date back to the time of the Portuguese. But the Portuguese ruled cruelly here, as elsewhere, and between 1660 and 1698

a renaissance of the Arab power (which had recaptured Maskat itself from the Portuguese in 1650) drove them out of Zanzibar and the Mombasa coast. From 1730 Zanzibar and Pemba became recognized as outlying posts belonging more or less to the ruling family of Oman, the Arab principality on the west shore of the Persian Gulf, of which Maskat is the capital. The Imam of Maskat was generally represented at Zanzibar by a brother or a relation, who ruled as his viceroy, but between 1746 and 1837 the chief of the Mazrui clan of Arabs of the Mombasa coast-lands maintained his independence of Zanzibar and Maskat. During the first half of the nineteenth century (from 1832 especially) Zanzibar became the great emporium of Arab trade, especially in slaves and ivory, on the east coast of Africa, and as it grew in wealth so the Sayyid or Arab Viceroy of Zanzibar grew in power and influence : so much so, that in 1840 the Imam of Maskat transferred the main seat of his government to Zanzibar, leaving Oman in Eastern Arabia to be governed by a regent. During the Napoleonic wars (from 1799) the British Government, desirous of keeping from the French every possible foothold on the shores of the Indian Ocean from which naval attacks might be directed against India, entered into intimate relations with the Arab rulers of Zanzibar and the adjoining coast, and finally interfered in the family quarrels between Oman and Zanzibar, and Zanzibar and Mombasa. Zanzibar made its first commercial treaty with the United States in 1833 ; with Great Britain in 1839 (first British agent and consul took up his residence in 1843) ; and with France in 1844. In 1861, by British intervention, Zanzibar was detached from the Arab state of Oman, and the Maskat prince, Majid-bin-Said, was recognized as the independent Sultan of the Zanzibar territories, which in course of time included the East African coast-line between Malindi on the north and Tunghi Bay (beyond Kilwa) on the south, and stretched inland to Tanganyika and Nyasa.

The Sayyid or Sultan of Zanzibar (Sa'id Sultan) as early as 1844 had shown himself tolerant of other religious

Connexion
of Oman
and
Zanzibar.

Mission-
ary estab-
lishments.

faiths than that of Muhammad, and had permitted the Württemberg missionaries, Krapf and Rebmann, who had been driven away from Abyssinia, to establish themselves as agents of the English Church Missionary Society at Mombasa. In 1864 the Universities' Mission to Central Africa transferred its head-quarters to Zanzibar from Nyasaland, and there has been an Anglican Bishop (formerly of 'Central Africa') at Zanzibar from about that period. In 1870 Barghash-bin-Sa'id succeeded his elder brother Majid as Sultan of Zanzibar. During his reign a great development of affairs at Zanzibar took place; and a notable personality during this period, 1870-88, was Sir John Kirk, who first came to this island as a British consular officer in 1866, and for twenty-one years practically directed the policy of the Arab Sultans of Zanzibar, inducing them by degrees to give up the slave-trade (1873), and finally to make its establishment in Zanzibar illegal. Before this period Zanzibar had been a place from which vast numbers of negro slaves derived from Eastern and Central Africa had been shipped to Arabia, Persia, India, Madagascar, the United States, and Cuba.¹

British
Protectorate.

The intervention of Germany in the affairs of Zanzibar in 1885-7 led to its being declared a British Protectorate in 1890, since which time, with an occasional check (a slight revolt in 1897 was checked by the bombardment of the Sultan's palace in Zanzibar), its prosperity has greatly increased under more or less direct British administration.

Commerce
and
foreign
popula-
tion.

Cloves, dry coco-nut kernel (copra), chillies, vanilla, sesame oil-seeds, copal gum, tortoise-shell, ivory, and india-rubber are the chief products and exports of

¹ Though the slave-trade was abolished in 1873, slavery remained a state or a domestic institution down to 1897: since which time it has been gradually coming to an end. The slave-trade on the East African coast was not extirpated till about 1895. In this long and thankless task of chasing and capturing Arab slave *daus* (dhows) and setting free thousands of negro slaves from the interior regions of East Africa, British naval officers and seamen displayed unflinching courage and not infrequently lost their lives in hand-to-hand combat. A noteworthy hero in these inglorious little wars which finally rid East Africa of a wicked devastating traffic, was Captain Brownrigg, killed in 1882.

Zanzibar and Pemba ; though the ivory and copal gum are only in transit from the mainland. The principal exports from Pemba, besides some £400,000 worth of cloves and cattle, are hides and tortoise 'nail', the product of a bivalve shell. The total of imports into the two islands for the year 1910 was equivalent in value to £993,031 ; in the same period the exports were valued at £1,033,467. The trade is chiefly done with India, and for a hundred years the population of Indian traders in Zanzibar has been steadily growing till it is now at least 10,000 in numbers. They belong chiefly to two types—the more or less Muhammadan Boras and Khojas from Bombay, and the Hindu Banyans from Kach : but there are also numerous Parsis (merchants and clerks) and Baluch adventurers (soldiers, caravan leaders, &c.). Nor must the important Christian Goanese element be overlooked. The Goanese are Portuguese half-castes speaking both Portuguese and English. The total population of the two islands in 1911 was approximately 200,000. Two-thirds of this population is of negro blood. There are about 10,500 Arabs, more or less free from negro intermixture and coming originally from Oman ; about 15,000 natives of India or types of Indian origin ; a few Malagasies from Madagascar : the remainder are minglings between all these ethnic types. The average Swahili man and woman is a good-looking, stalwart negro or negroid with nearly black skin but a pleasing and even handsome face, due to the ancient and modern intermixture with Asiatic types. With the exception of about 2,500 Hindus and about the same number of Christian Goanese and of negroes trained at the Anglican and Roman Catholic Missions, the whole of the native and Indian population of Zanzibar and Pemba is Muhammadan in religion (Sunnis of the Mafi sect, Ibadhis of Oman,¹ and the heretical Boras and Khojas who are Indian Shias, the last-named subject to the Aga-Khan of Bombay). There

¹ The Imams of Maskat, who more or less ruled over all Oman—Eastern Arabia—began as the religious heads of the Ibadhi sect in 751 A.C., and gradually developed into secular rulers. The dynasty still reigns at Maskat.

are about 250 Europeans in Zanzibar and Pemba, mostly British, and connected with the Government, the missionary societies, the planting industries and the telegraph. Zanzibar is a most important telegraph station for the African cables, which are landed here, and connect Zanzibar with Aden, South Africa, Moçambique, Uganda, Madagascar, and the Seychelles.

The city of
Zanzibar
and other
settle-
ments.

The history of the modern city of Zanzibar, the capital of the Sultanate (with a population of about 100,000), no doubt goes back to before the Christian era, but a good deal of the existing Arab portion of this city was begun in the year 1832, when it became the capital of the East African dominions of the Imam of Maskat. The Arab city, built on the sea front of a triangular spit of land behind which is a shallow creek, consists of tall whitewashed houses of coral stone with a good deal of picturesque Saracenic architecture. To this has been added in the last twenty years a prosperous-looking European quarter, while the negro dwellings on the outskirts are of wattle and daub with thatched roofs. Besides the capital there is no regular town in the island of Zanzibar, but there are Arab and negro villages at Chuaka (a large bay of that name, on the eastern side of the island), Dunga (in the centre of the island), Kokotoni at the north end of the island, and Kizimkazi at the south end. The islet of Tumbatu on the west side of the north end of Zanzibar is of importance, as it is the home of the best and sturdiest Swahili seamen, so many of whom serve in the British men-of-war and the mercantile marine (as firemen), and in the Arab and Indian sailing vessels.

The capital of Pemba is Chaki-Chaki, at the head of a deep inlet on the western side. Other ports (good harbours, also on the west) are Port Cockburn and Port George. There are several harbours in both islands capable of acquiring great strategical value for a fleet operating in the western Indian Ocean.

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CHAPTER XII

BRITISH EAST AFRICA

BY SIR HARRY H. JOHNSTON

BRITISH EAST AFRICA is a Protectorate of about 247,000 square miles in area, in the equatorial regions of Eastern Africa. Its coast-line ranges from the mouth of the Uмба River in 4° 30' S. (opposite Pemba Island) to the mouth of the Juba River in 0° 15' S. Inland it extends along the Juba River, the Daua River, the Goro escarpment, and the shores of Lake Rudolf, and thence along the Turkwel River to Mount Elgon and the shores of the Victoria Nyanza. On the south it passes round the northern base of Mount Kilimanjaro, and is bounded by German East Africa.

Its physical features and geology are alike remarkable for diversity and special interest. Almost within its south-eastern limits is the loftiest mountain of Africa, the volcanic dome of Kilimanjaro (19,200 feet). The two summits of this immense mountain are actually within the German territory, though the British flag was hoisted on them before that of any other power; but the British Protectorate extends to the Taveita territory on the south-eastern slopes of Kilimanjaro. The second highest mountain of Africa, however, the volcanic Kenya (altitude, 17,007 feet), is wholly within British territory,

Physical
geo-
graphy.

and nearly in the centre of the Protectorate. Other lofty mountains claimed by East Africa are the enormous extinct volcano of Elgon (14,200 feet on the highest point of its rim); the Laikipia escarpment (highest points, Gojito, 13,390 feet, and Kinangop, 12,920 feet); the Sattima or Aberdare range (altitude at highest point, 13,214 feet); Londiani, and Chibcharañani peak (Mau and Elgeyo escarpments, each about 10,000 feet); the volcano Longonot (Mau plateau), 9,224 feet; the Kikuyu escarpment, 8,000 feet; Nandi plateau, 8,000 feet; Uas Ngishu plateau, 7,000 feet; Mount Kanjora, east of Lake Rudolf, 6,900 feet; highest point in the Goro escarpment, on the northern boundary of the Protectorate, 6,000.

A good deal of the surface of this Protectorate consists of elevated plateaus between 5,000 and 8,000 feet in altitude above sea-level, and is consequently a country that is healthy and suited to European settlement. A very interesting natural feature is the great Rift Valley, first made known to us by the German explorer Fischer, and better explored by Joseph Thomson. This is a fault in the earth's surface, which runs with some interruptions between the north end of Lake Nyasa in the south and the Gulf of Tajurra opposite Aden. Here the rocks, over a breadth of thirty miles or so, have slipped down two or three thousand feet, or more, so that the sides of this broad valley often rise as lofty precipitous cliffs. Throughout the Rift Valley there is much evidence of ancient, recent, and present volcanic activity. The majority of the British East African mountains are extinct volcanoes; near the south end of Lake Rudolf they have been in active eruption in modern times. In the Rift Valley in many places the cracks in the rocks emit smoke and steam. Considerable portions of the Protectorate are covered with the ancient and modern outpourings of volcanoes. In some parts this volcanic soil, having crumbled under the influences of weather and rain, is exceedingly fertile.

Climate.

The northernmost parts of the territory suffer much from lack of rainfall, and offer conditions almost resembling those

of a desert, though there is probably no area of actual drifting sand. Yet within this Protectorate are some of the densest and richest forests of Africa, especially on the slopes of Mount Kenya, on the Kikuyu, Mau, Nandi, Elgon, Lumbwa, and Sotik highlands. Here, where the altitude is not high enough to give it a special Alpine character (recalling the flora of the Abyssinian mountains and of Cape Colony), the vegetation almost rivals that of western equatorial Africa in luxuriance and tropical features. But not only is the flora of these elevated forests of West African affinities, but so is the fauna. Although the true West African region stops in its eastward advance at the banks of the infant Nile in Uganda, isolated examples of its fauna extend across East Africa to the forests of Mount Kenya, as will be shown further on. The rainfall of British East Africa varies a good deal according to altitude. That of the narrow coast-belt about Mombasa, and again in Witu, north of the lower Tana, is probably an average 50 inches per annum, and the vegetation of this narrow strip from the German frontier on the south as far north as the dense forests of the lower Tana and Witu (but excepting the dry strip between Malindi and Formosa Bay) is rich, but more especially in cultivated and introduced trees. Ten miles from the coast, proceeding westwards, the rainfall diminishes markedly, and is even scanty over much of East Africa until an altitude exceeding 5,000 feet has been attained along the Kamba and Kikuyu highlands. From this region westwards to the Victoria Nyanza the rainfall ranges from an average 40 inches per annum to nearly 100 inches in the densely-forested slopes of Mount Kenya and on the plateaus that descend towards the Victoria Nyanza. The east coast of that lake has a rainfall of 60 inches. The rainfall of Kavirondo is probably not more than 50 inches per annum, but is fairly well distributed throughout the months of the year. The heavy rainfall of Elgon ceases somewhat abruptly on the north. Along the shores of Lake Rudolf there may be only 10 inches of rain in the year, and some years are

said to pass without any rain at all. The rainfall over the northernmost parts of East Africa between Lake Rudolf and the mouth of the Juba is very scanty and uncertain, and much of the country between the Tana river and the Juba is in its present conditions scarcely inhabitable except by nomadic pastoral people.

Hydro-
graphy.

The most important river of the Protectorate as regards length is the Juba, which for the lower part of its course is the boundary between Italian Somaliland and British East Africa. Its affluent, the Daua, forms a portion of the boundary between the empire of Ethiopia and British East Africa. The head-streams of the Juba rise far away in Abyssinian Galaland, and the total course of the river may be something like 1,000 miles in length, but not much of the stream is suited for navigation all the year round. The next most important river as regards volume and navigability is the Tana, the head-streams of which rise on the slopes of Mount Kenya and on the Kikuyu highlands. The navigation of this river is not interrupted so much by the failure of the water-supply (owing to the snows of Kenya) as by the presence of rapids, rocks, and snags. It has a length of about 500 miles, and has been ascended by a steam launch for about 300 miles. The Sabaki River rises in two branches (the well-known Athi is its chief stream) to the north and north-west of Kilimanjaro, and flows into the Indian Ocean near Malindi, but is of no use for navigation. The streams which flow westwards into the Victoria Nyanza are of no great size and of no importance as navigable routes into the interior. The longest are the Nzoia and the Lukôs (Kavirondo), and the Kunsonoi or Kosova (Lumbwa). In the central part of the Protectorate the long Guaso Nyiro rises to the north-west of Kenya and flows far into Galaland, where it is lost in a swamp.

Vegeta-
tion.

The most noteworthy features in the vegetation of the more arid parts of East Africa, especially at levels below 3,000 feet, are the huge gouty baobab trees, the dense thickets of acacias with very little foliage and savage white thorns, the wild figs (growing independently or as

parasites on other trees), the *Kigelia* trees with enormous pendent fruit like huge sausages, the clumps of leathery *Sansevieria*, an aloe-like plant valuable for its fibre, the branching hyphaene and the tall borassus fan-palms, the wild date-palms in the watercourses, and the candelabra euphorbias. The grass in these lowlands, if it exists at all, is coarse and grows to a great height. Above 3,000 feet in altitude the grass is shorter and more turf-like, and although there are vast areas that are almost treeless, the sides of the rivers are fringed with palms, apocynaceous rubber-lianas and trees, figs, euphorbias, sterculias, and parinariums. On the slopes of the mountains and plateaus, between 5,000 and 8,000 feet, where there is a good water-supply and perhaps a heavy rainfall, the forest is almost West African in its features and component trees and shrubs. Above 8,000 feet, bamboos, yews (*Podocarpus*), and junipers are the most striking features in the vegetation. At 10,000 feet and above, one enters upon the really Alpine flora of East Africa, of a singularly interesting nature, consisting, amongst other things, of giant groundsels, lobelias, kniphofias, and arboreal heaths of fifty feet in height. Above 8,000 feet much of the vegetation is hung with the graceful greenish-grey orchilla lichen. Tree-ferns are also found on the high mountains between 7,500 and 10,000 feet. In the swamps between sea-level and 6,000 feet the papyrus rush is found abundantly, and beautiful blue lotus water-lilies, besides white water-lilies, cover the surface of still water. As there is no very definite dry season or wet season of the year in East Africa (owing to the great variety of altitude of its surface and the fact that it lies within the Equatorial Zone) the country is gay with bright flowering plants in almost all the months, except, of course, in the particularly arid regions of the north. Even in the dry months there are grey, gouty-looking branches of low-growing shrubs which blaze with pink oleander-like flowers, and ground orchids and gladioli are of singular beauty and of many varieties.

The fauna of British East Africa is exceptionally rich. Fauna.

It contains examples of nearly every African genus or even species of antelope; in it still linger herds of buffaloes, elands, kudus, dwarf kudus, and giraffes (this last of three kinds); lions, leopards, chitas, spotted and striped hyenas, aard-wolf, black-backed and side-striped jackals, mongooses and civets; two-horned rhinoceroses, elephants with enormous tusks, and hippopotami are found. In the dense forests of Kenya and the Nandi plateau the big black forest pig of equatorial Africa (*Hylochoerus*) still lingers, only discovered by science within the last few years. In these same forests is also found the beautiful red, white-striped bongo tragelaph (*Boocercus*), with broad, bush-buck-like, lyrate horns. There is a water tragelaph (*Limnotragus*) on the shores of the Victoria Nyanza. Noteworthy also is the rare Otocyon dog, with four molar teeth and affinities with the extinct creodonts. The zebras are the handsome broad-striped Grant's zebra and the large narrow-striped Grevy's zebra. There are perhaps in the north troops of wild asses of the Somali or Ethiopian type. Besides the forest pig already mentioned, there are the bush pig and wart-hog. There are many rare and interesting rodents. The monkeys include two or more species of baboon, the handsome black and white colobus, a red colobus, the grivet and patas monkeys. The edentates are represented by the *Orycteropus* and the *Manis*. Otters are common in the lakes and rivers. As to the birds of British East Africa, they include amongst other noteworthy types the magnificent vulturine blue guinea-fowl (almost peculiar to this region), the secretary bird, the ostrich, the crowned crane (which reaches its most remarkable development in the vicinity of Kilimanjaro, where there is a peculiar species), besides almost all the birds of East and Central Africa. There are more vultures here than there are in Central or West Africa. The grey parrot frequents the forests of the Kikuyu highlands and the basin of the Victoria Nyanza. There are many kinds of snake, including poisonous cobras, puff-adders, and *Causus* vipers. The crocodiles of the rivers and lakes are of the ordinary

Nilotic species, but some of them attain to a considerable size, perhaps as much as twenty feet in length.

The people of this region, unlike those of Central Africa, are greatly varied in racial type. Putting aside the Europeans who have recently settled on the uplands, and perhaps numbered as many as 5,000 or 6,000 in the year 1912 (chiefly British and Cape Boer), there is a sprinkling of Arabs of more or less pure descent in the east-coast region, which indeed constitutes a separate province known as Sayyidiah, because of its former subjection to the Sayyids or lords of Zanzibar. These Arabs, more especially of the Mombasa district, however, were descended more from the Arabs of Egypt, Yaman, and South Arabia than those of Oman (East Arabia), and for long there was war between them and the Maskat Arabs of Zanzibar. At Lamu, Malindi, and Mombasa, also, there are traces of ancient Persian colonies, not only in the existing types of people, but in the archaeology of the country. The northern third of British East Africa is scantily peopled, but the dominant type is not negro, but Gala or Somali negroid. The Somalis and Galas, indeed, have crept down the coast-line of East Africa far to the south of the Juba River, and the Galas may be met with along the northern banks of the Tana. The Somalis of the Ogadein (Hawiya) and Rahanwin groups have given a great deal of trouble to the British Government since the definite occupation of East Africa, and in the nineteenth century they and the Galas opposed strongly any exploration of these regions, and killed most of the Europeans who penetrated into their country. The Galas of northern British East Africa (not Muhammadans like the Somali) are a fine race, and it is to be hoped that they will become reconciled to the sway of the European, and increase and multiply. About the shores of Lake Rudolf, though there is evidence of ancient Gala or Somali intermixture, the negroid type fuses more into the negro. The people of this region and all the course of the Rift Valley, of the Elgon, Nandi, Lumbwa, and Sotik highlands, and of the elevated plateau region east of the Rift Valley,

between Kenya and the German frontier (except Kikuyu), belong to the Masai group of the Nilotic negroes. In their physique they betray marked evidences of non-negro affinities, due to an ancient intermixture in East and North-east Africa between the Caucasian invaders speaking Hamitic languages (like Kafa and Gala), and the aboriginal negro population. The Masai proper at the time when this region was taken in hand by the British Government were still nomadic in their habits, ranging over great distances in East Africa with their herds of cattle. They were predatory, and were perpetually attacking the settled agricultural negro tribes, whether these belonged to the Bantu family or were agricultural relations of the Masai themselves. But the Masai have a great liking for the white man, and once white rule was effectively established they have given little trouble. In their language they are obviously related to the negroes of the Nile basin. The agricultural Masai (Kwavi, Enjámusi, Uas Ngishu) are found about Lake Baringo, the northern part of the Rift Valley, and the plateaus leading towards Elgon. The people of the highlands immediately west of the Rift Valley (Nandi, &c.), though distantly connected with the Masai in language and very like them in physical appearance, form a distinct group by themselves. Related to them in speech are Sük (Elgeyo valley and south-west Lake Rudolf) and the interesting Andorobo hunting nomads or gipsies. These Andorobo speak a language of the Nandi group, but in physical appearance exhibit great variety of type, some of them being like Galas (and consequently Caucasian in face features), whilst others resemble Bushmen or Congo pygmies. They would seem to be the scattered remains of outcast tribes, some of them Bushmen or Pygmy stock, which are united by the common use of a Nandi dialect. In the western parts of British East Africa dwells another Nilotic people, the Ja-luo, originally called the Kavirondo, though that name applies more to their Bantu neighbours. These Kavirondo people, who are still going about in perfect innocence without a vestige of clothing, came at no very

Sük and
Andorobo.

Ja-luo.

distant date from the Nile basin to the north of Uganda. Their speech is still closely related to the dialect spoken at the north end of the Albert Nyanza.

But the bulk of the negro population of East Africa ^{Bantu.} belong, so far as its linguistics are concerned, to the Bantu family. In the towns of the coast we have a heterogeneous negro population speaking Swahili. In the open country and behind the coast towns are indigenous Wa-zigula, Wa-digo, Wa-duruma, A-giriamama, A-nyika tribes, using languages of the Zigula and Nyika groups. Further to the north on the coast is a negro nomad hunter tribe, the Waboni or Wasania, who speak a debased Gala dialect. In the islands of Lamu, Patta, Manda, &c., and the adjoining Witu country, the language and population are mongrel Swahili, with a marked Persian and Arab intermixture. North of the Witu district on the coast, and thence around to the Juba River, the Somalis (much mixed with negro blood, and chief of the Ogadein clan) are the dominant element. West of the Nyika country we have the Taita clans, and further to the north and west are the Kamba and Kikuyu groups. The A-kamba are a rather handsome negro people betraying obvious affinities with the Gala in physique. The Kikuyu of the high plateaus are shorter in stature and more negro in appearance. Tribes of this stock (so far as the language is concerned) extend northwards to Mount Kenya and the upper waters of the Tana River, while the lower half of the Tana course is occupied by the Pokomo people, who are more related to the Swahili group. Westward of Kikuyu, negro tribes speaking Bantu languages come to an end, and we do not reach the Bantu type again till we have travelled as far west as northern Kavirondo or the north-east or eastern coastal districts of the Victoria Nyanza. The Kavirondo Bantu and the Ba-kisii of the eastern Victoria Nyanza basin are related in speech, though their distribution is interrupted by the invading Nilotics. The Kavirondo are a naked, good-looking folk; and their dialects, which extend as far to the north as the north-west slopes of Mount Elgon,

are of singular interest to students of Bantu philology, as they are very archaic. The southernmost member of the Kavirondo group is the rather distinct speech of the Kissi or Ba-guzii people in the Kosova country and a portion of the Nyando valley. The greater part of the inhabitants of Mount Elgon (Mutei and Sabei) and of the Elgeyo and Kamasia highlands belong to the Nandi stock ; but it is very interesting to find on the extreme north-west of this huge volcano, almost isolated amongst Nilotic peoples, savage tribes of rather repulsive and forest-negro-like appearance, speaking the most archaic dialects of Bantu as yet discovered.

Popula-
tion and
native
culture.

The total native population of the British East Africa Protectorate is put approximately at 4,020,000. There are about 5,000 Europeans and 25,000 Indians and Arabs. Native culture is of many different stages. The people of the coast-belt along the Indian Ocean, scarcely more than ten miles in breadth, have long been semi-civilized by Arab and Persian influence, so that they live very much in the style of Southern Arabia or Muhammadan India. Yet it is remarkable, considering how long the Arabs have occupied this part of East Africa—quite 2,000 years—how soon their influence dies out to the westward. Until twenty or thirty years ago the negroes of East Africa at a distance of thirty miles back from the coast were living in a savage condition. It was not till the vicinity of the Victoria Nyanza was reached that anything like Central African culture of the Uganda type was met with. Enormous progress has been made during the past twelve years, mainly through the establishment of missionary stations, the settlement of British and Boer planters, and the indefatigable efforts of Government officials. At the same time, natives of India, partly through the construction of the Uganda Railway, have begun to permeate British East Africa in all directions, creating trade where trade did not previously exist.

Though this region for the past half-century has been more or less permeated by Arab and Indian caravans trading for ivory and slaves, it remained down to the

last quarter of the nineteenth century the least known region of East Africa, the hindrance to its exploration lying chiefly in the terror inspired by the Masai. The Masai were pitiless towards the negro tribes, or the Muhammadan-negro traders from the Zanzibar coast-line; partly because they had an instinctive feeling that they were not themselves entirely negro, but had some mingling of other blood in their veins, and partly because the terror created by their reckless bravery and long spears created a panic which lasted for fifty years, and made the Masai bullies who presumed on their reputations. But this pride of race and this sense of affinity with the white man, curiously enough, made them eventually the white man's allies in the opening up of equatorial East Africa.

The history of British East Africa from the white man's point of view is very slight down to the celebrated journey of Joseph Thomson in 1882. This is so far as written records extend. But, as a matter of fact, the white man in his Mediterranean varieties has meddled with East Africa for tens of thousands of years. He came there first of all as a naked yellow-skinned hunter, with improved stone weapons, and he mingled with the antecedent pygmies, bushmen, and negroes, thus creating numerous hybrids, each of which in turn either perpetuated itself directly in the form of the Gala and Somali, or interbred again with the negro, thus producing various types of Nilotic negro: Nandi, Masai, Andorobo, and A-kamba. Into this region came at an early date (compared to the rest of tropical Africa) the white man's domestic animals: the humped cattle of Indian type, or the closely allied and perhaps older Egyptian long-horned cattle, with straight backs, but elevated spine ridges; the fat-tailed sheep, the little Sudanese goats, the pariah dogs, and the domestic fowl. Arabs from south-west Arabia, possibly even the Egyptians themselves when they came under Greek influence, rounded the great promontory of Somaliland and traded with the Lamu-Mombasa coast; and the Axumite Abyssinians may have come over-land. There are stories, not incredible, of Byzantine Greeks stranded at some such

Exploration and settlement.

Arabs.

place as Mombasa on journeys which they had intended to make to India, who for purposes of trade or out of curiosity travelled inland and thus caught sight of the snow-crowned volcanoes of Kilimanjaro and Kenya, and heard stories of the great lakes in the far interior from which the Nile derived its twin sources. After the great outburst of Islam had united all Arabia for a time into a common nationality and given a renewed impetus to Arab enterprise, the Arabs from Egypt, Yaman, Aden, South Arabia, and Oman once more established trading colonies along the East African coast as far south as Cape Corrientes, near the modern Inyambane. The most important trading centre in this loosely-knit Arab empire over East Africa down to the sixteenth century was Kilwa; but powerful Arab and Persian colonies grew up round about Mombasa, Malindi, Lamu, Pate, and Manda. Most of these northern East African settlements were founded by religious schismatics, who fled from Arabia or Persia before the persecution of the orthodox. This Lamu-Mombasa region frequently displayed its independence of the Kilwa-Zanzibar and Sofala groups of Arab colonies. Probably each great trading centre (and in the Mombasa connexion must be mentioned the once important towns of Magdishu and Barawa on the coast of Italian Somaliland) was from time to time under the independent rule of a petty sultan or of a council of elders, while at other times all the trading cities alike had to bow to the domination of a successful Arab conqueror. At the end of the fifteenth century the Portuguese arrived on the scene, their ships having rounded the Cape of Good Hope and found the ocean route to India. With their superior artillery they rapidly reduced to submission all the Arab cities and states along the east coast of Africa from Inyambane to Magdishu (Mogadoxo). More especially did the Portuguese settle at Sofala (near the modern Beira), at Quelimane (north of the Zambezi delta), the islands of Moçambique and Zanzibar, on the one hand, and Vanga, Mombasa, and Malindi on the other, building fortresses and churches at all these places, especially at Mombasa (1594). Mombasa

Portu-
guese.

had been occupied by the Turks, coming by sea from Egypt in 1576-86. At the close of the sixteenth century ^{Ba-zimba.} the hinterland of Mombasa, like much else of East Africa (whether it remained under the Arabs or the Portuguese), was invaded by a mysterious devastating horde of savages known as the Ba-zimba (Va-zimba, A-zimba). It is practically certain now that the Ba-zimba were the same people as the existing Ba-jok or Va-Kioko of Eastern Angola between the Kirango and Kasai—the 'Jagga' of the Portuguese chroniclers. In the middle of the sixteenth century they swarmed north—killing and eating the negro tribes in their path—till they reached Loango. A larger section swarmed south and reached the north bank of the middle Zambezi, whence one band penetrated to Moçambique, Kilwa, and Mombasa, where they were decisively defeated in 1588-9 by the Portuguese and Segeju, the last named being a Gala tribe of warlike disposition allied with the Portuguese, who styled them 'Mo-seguejo'. In 1593-5 the great fort was built at Mombasa by the Portuguese. Towards the end of the <sup>Later Arab settle-
ment.</sup> seventeenth century began a renaissance of Arab power on the east coast of Africa, partly from the direction of Oman on the Persian Gulf. Fleets of well-armed Arab vessels (often assisted indirectly by artillery obtained from the Turks) contended on equal terms with the Portuguese ships, and the result was, after being twice lost and twice regained (in 1698 and in 1729), Mombasa fell finally into the power of the Arabs. Zanzibar, Malindi, Magdishu, &c., had become Arab some time before, and by 1730 there was no vestige of Portuguese power left in equatorial East Africa. Henceforth the fate of the Mombasa coast-line was very much mixed up with that of Zanzibar, though the Arab viceregal and royal family of the Mazrui¹ (who sometimes claimed to be of Egyptian origin) long fought against the pre-eminence of Maskat. They had formerly ruled for the Imams of Maskat after the capture of Mombasa in 1698; but when a change of dynasty took place in Oman in 1748, the Mazrui set up as independent

¹ This word is sometimes rendered Mazaru'i.

sovereigns of the Mombasa coast from Lamu to Pangani, and also to Pemba Island. The quarrels between these rival Arab families attracted the attention of British naval officers (Captain Owen's expedition), and after their intervention in 1822 the British flag was hoisted over Mombasa, and Lieutenant Reitz, R.N., was established as British Resident. But the British Government repudiated this action, and eventually Mombasa was conquered by the forces of the Sayyid of Zanzibar in 1837. The princely Arab family of the Mazrui then split into two branches, and more or less ruled the Mombasa hinterland until 1896.

The mis-
sionaries
Krapf
and
Rebmann.

The next stage in East African history is marked by the arrival of the two Württemberg missionaries, Ludwig Krapf (who reached Mombasa in 1844) and Johann Rebmann (who joined Krapf in 1846). These remarkable men were in the service of the (English) Church Missionary Society. Krapf as early as 1838 had striven to evangelize Abyssinia in the cause of Anglican Christianity, but had been compelled to leave that inhospitable land. He decided to appeal to the more liberal-minded Sayyid or Sultan of Zanzibar, by whom he was favourably received, and was allowed to establish himself near Mombasa (Rabai). From this point Krapf and Rebmann, and later Erhardt, began to explore the interior. Rebmann travelled inland in the spring of 1848, and on May 11 in that year discovered the great snowy dome and jagged smaller peak of Kilimanjaro, reaching to within about fifteen miles of the mountain base. In the following year, 1849, Krapf made a wonderful journey, in which he must have marched something like twenty-five miles a day, and have put up with very scanty fare. He had no tent, and often slept on the bare ground. But in the course of his zigzag route he managed to get a glimpse of the great snow mountains, Kenya and Kilimanjaro.

European
explora-
tion.

Rebmann in 1850 again visited the base of the Kilimanjaro and reached Machami on its western flanks. The information which these missionaries sent back to Europe, combined as it was later on with remarkable stories, very near the truth, of the existence of a great lake, or several

great lakes in the far interior, excited considerable interest in England, France, and Germany, and led in course of time to the dispatch of exploring expeditions, most of which in the more southern regions of East Africa ended disastrously. The most notably successful, though it traversed very little of British East Africa, was that commenced by Sir Richard Burton and Captain J. H. Speke in 1856. These explorers had half wished to enter the continent by way of Mombasa, and so make their way directly towards the rumoured lakes. But the Masai, who must have descended from the regions round Lake Rudolf in the early part of the nineteenth century, had by their raids caused journeys through the hinterland of Mombasa to become so unsafe that very few Arab caravans could be persuaded in 1856 to face these dangers. Consequently, Burton and Speke took the more southern route opposite Zanzibar, and Speke subsequently found his way to the Victoria Nyanza.

As time went by and no confirmation arrived regarding the existence of the snow mountains, great doubt was thrown on the explorations of Krapf and Rebmann. To solve these doubts there came out from Germany in 1861 a notable explorer, Baron Karl von der Decken, a Hanoverian, who with a well-equipped expedition, which included Englishmen in its service, made his way to Kilimanjaro. In two expeditions (1861-2) he explored very carefully all the eastern, southern, and western sides of this great mountain mass, but did not succeed in reaching to the actual snow, nor did he make any exploration of the north side. Subsequently, attempting to penetrate into East Africa up the Juba River, he was killed by the Galas (1865). A British missionary in the service of the United Methodist Free Church Mission—the Rev. Charles New—penetrated to Kilimanjaro in 1871 and ascended the mountain as far as the limit of the snow, about 14,000 feet. The extraordinary gap on the map between the east coast of Lake Victoria Nyanza (which had been explored for the first time by Stanley in 1875) and the Mombasa coast-line, attracted the attention

The exploration of Mounts Kilimanjaro and Kenya.

of the Royal Geographical Society (stimulated by the research work done by the geographer, E. G. Ravenstein, and the information collected by the missionary Wakefield in East Africa). This Society therefore dispatched the explorer Joseph Thomson in 1882 to travel through the Masai countries to the Victoria Nyanza, to locate the almost mythical Mount Kenya and examine the north side of Kilimanjaro. All these purposes were achieved by Joseph Thomson, whose name (scarcely commemorated locally) must rank very high in the history of British East Africa. To him is due almost directly the extension of the British flag over these regions, though this flag was actually hoisted there for the first time in 1884 by (Sir) H. H. Johnston, who had been sent out by the Royal Society and the British Association to examine the fauna and flora of Kilimanjaro. In 1888 an expedition under Count Samuel Teleki and Lieutenant Höhnelt (Austro-Hungarians) penetrated inland along Thomson's route, and discovered Lake Rudolf.

British
East
Africa
Company.

As the result of treaties made by Mr. (now Sir Harry) Johnston, on the south side of Kilimanjaro and at Taveita, the Imperial British East Africa Company was founded, and took possession of concessions in the vicinity of Mount Kilimanjaro. Soon afterwards it obtained a lease from the Sultan of Zanzibar and a charter from the British Government, and began to administer and develop British East Africa from 1888 onwards. German companies had obtained somewhat similar rights on Kilimanjaro and in the little sultanate of Witu, near Lamu. Eventually, by arrangements between the two governments in 1890, all German claims north of Kilimanjaro were withdrawn and British East Africa was demarcated much as it now appears on the map. The charter of the Company was recalled in 1895, and from that year onwards the British Government has directly administered these East African territories, which by various arrangements have been extended eastwards to the shores of the Victoria Nyanza and the slopes of Mount Elgon, north to Lake Rudolf and the Abyssinian and Italian Somaliland

frontiers. After the Imperial Government had attempted to take the place of the Chartered Company, a war broke out with the Arab princes of the Mazrui family in the region south-west of Mombasa. Some very stiff fighting followed, but the trouble was completely settled by Sir Arthur Hardinge, the British Commissioner. In 1890 a British naval force had punished Witu for atrocities inflicted on German traders, but since 1894 Witu has been a well-governed native state. In 1898-1901 a great deal of trouble occurred with the Ogadein Somalis of the lower Juba.

The Uganda Railway was built at the expense of the British Government between 1898 and 1903, in which year it was finished as far as the Kavirondo Gulf of the Victoria Nyanza. No sooner was this railway near completion than settlers began to arrive, attracted by the splendid climate of the uplands. Some 600 or 700 Boers came from South Africa after the conclusion of the war there. This settlement of the interior by scattered families of white men and women has led during recent years to a little trouble between them and the British administration, the last named being especially anxious to avoid any injustice in the matter of native rights and discountenance any aggressive treatment of black by white.

Transport
and
trade:
Uganda
Railway.

In 1888, at the time that the East Africa Company began its administration, the trade between East Africa and the outer world was not large. It was chiefly limited to slaves, (who were smuggled across the Indian Ocean to Arabia, Turkey, Persia, and Madagascar) and ivory. From British East Africa come the biggest elephant tusks that have ever been known since the extinction of ancient species. The best ivory in the world comes, or came, from the regions between Lake Rudolf, the Albert Nyanza, and the Mountain Nile, and much of this found its way, in spite of the Masai, through the port of Mombasa. But the total value of the trade (which also includes the hides of zebra, antelope, and buffalo) probably only amounted to £100,000 annually, excluding any attempt

Com-
merce.

to put a money value on the slaves. In the year 1911 the trade of British East Africa with the outer world consisted approximately of £2,000,000 in imports and £1,000,000 in exports, and amongst the exports ivory now takes a subordinate position, the chief substances produced and sold by the country being cotton, hides, sheep's wool, potatoes, maize, copra, india-rubber, and wild animals.

Natural
products.

The deposits of natron and diatomite in the beds of dried-up lakes in the more southern part of the Protectorate are proving to be of considerable commercial value, but so far there have been no notable discoveries of gold or other valuable metals, or of precious stones. Gold, however, exists; also manganese and opals. There are no manufactures, unless it be local ones of aerated waters, or to meet other wants of the white community. The main system of transport is that of the Uganda Railway, with its branches north and south. The development of this region was enormously hindered because a good deal of its surface was infested with the tsetse fly (which destroys cattle and horses), and was dependent exclusively on human portage for the conveyance of goods; for not even donkeys and mules—though much employed—were of much use for the conveyance of goods, partly owing to the number of lions which ranged the interior before the coming of the white man in force. Far away from the railway lines, consequently, the land is still in a somewhat primitive condition, but the natives in all directions are taking to agriculture in preference to a nomad life, or at any rate, to the rearing of live-stock for sale to Europeans. Probably for a long time to come the main industries of this region will be agricultural. The 3,200 square miles of forests on the elevated plateaus and mountains contain valuable timber, especially that of the juniper and podocarpus; and there is a small but valuable forest area of tropical forest-trees at Witu on the Ozi River, and at Taveita near Kilimanjaro.

Big game
and its
preservation.

Another asset, the value and importance of which is gradually being realized before it is too late, is the superb development of wild life in the herds of big game which

still exist in parts of British East Africa, though they are steadily diminished year by year by enthusiastic sportsmen. There are certain game reserves in which, theoretically, no shooting is allowed, though this rule is not strictly enforced. Why it should be a matter of national pride, displayed in a yearly blue-book, that from 200 to 300 rhinoceroses have been slain annually, is difficult to understand. It will probably be found in the long run far more profitable that no big game whatever should be killed in the game reserves or in the wilder districts where it does no harm to settled agriculture. In any case, such protection as has been afforded has attracted annually numbers of tourists who find pleasure and interest in travelling through this natural zoological garden.

Though there are Government schools established at Mombasa, Nairobi, Nakuro, and on the Uas Ngishu plateau, the education of the natives is still in the hands of various missionary societies, notably that of the Church Missionary Society (Anglican), of the Scottish Churches (Presbyterian), and of the Roman Catholics (French and English Missions), and a Swedish Lutheran Mission, Galaland and Tanaland. The government is administered by a Governor and Commander-in-Chief appointed by the Sovereign on the advice of the Colonial Office; there is usually a Lieutenant-Governor and the customary hierarchy of subordinate officials; there is a Secretary for Native Affairs, and the Governor is assisted by the advice of a Council, official and (nominated) unofficial. The revenue—approximately £610,000—does not yet meet the expenditure, £682,000, and the deficit is supplied by a grant in aid from the British Parliament.

The Protectorate is divided into seven provinces and a partially organized territory (Galaland) in the far north. The provinces are (beginning on the coast), *Sayyidieh* (Mombasa), *Ukamba* (Nairobi, capital), *Tanaland* (Lamu), *Jubaland* (Kisimayu), *Kenya* (Fort Hall); *Naivasha* (Naivasha), *Nyanza* (Kisumu).

The chief post in northern Galaland is Marsabit. Order

is maintained by a small army of negro soldiers and British officers, and a force of 1,800 negroes and Somali policemen.

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CHAPTER XIII

THE UGANDA PROTECTORATE

BY SIR HARRY H. JOHNSTON

UGANDA was the name applied to a great Central African empire by its European discoverer, Captain John Hanning Speke. He derived the name from the version of the Swahili Arabs who were his guides on his two journeys of 1857-8 and 1859-62. Or it may be that his companion, Richard Francis Burton, may have made use of the word first, deriving it from the same source. As a matter of fact, the word, if it is to be given in its native form, should be 'Buganda', and this is the term now reserved by the British Government for the designation of the metropolitan province of the Protectorate, the native kingdom of Buganda. The form Uganda, however, has been consecrated by long usage, and will henceforth be applied to the whole of this region, which has an area of about 118,000 square miles, and is bounded on the south by the Victoria Nyanza, and German East Africa; on the west by a line drawn northwards from the Mfumbiro volcanoes through Lake Edward and along the crest of the Ruwenzori Mountains to the Semliki River, Lake Albert Nyanza, Mahagi, and the water-parting between the Congo basin and the Mountain Nile; on the north by the 5th degree of N. latitude and the Anglo-Egyptian Sudan; and on the east by Lake Rudolf and the Turkwel River, Mount Elgon, and the Nzoia River, to the Victoria Nyanza (frontier of the British East Africa Protectorate).

The Uganda regions lie in equatorial East Africa, the equator passing through them, but should properly be considered a part of Central Africa, their affinities in flora and fauna, and in peoples, lying rather with the central and western regions than with the real east coast, from which they are separated by a distance of not less than 700 miles. The Uganda Protectorate is essentially

Natural
condi-
tions.

Head-
waters of
the Nile
system.

bound up with the Nile question. The farthest stream to the south which feeds the Nile rises, it is true, outside the British borders in German East Africa, not far from the north-east coast of Tanganyika. The most important of these southern affluents of the Nile system is the Kagera River, which is the main feeder of that great shallow lake, the Victoria Nyanza, the biggest of the fresh-water seas of Africa, and (with the exception of Lake Superior) the biggest fresh-water lake in the world, with an area of a little over 26,000 square miles. The Kagera flows first through German territory and then through both British and German Africa, its outlet into the Victoria Nyanza being entirely within British limits. There is a perceptible drift of the water between the mouth of the Kagera and the exit of the Victoria Nile on the north coast of the lake, and the large archipelago of the Sese Islands seems to be the vestige of an ancient barrier of the Kagera-Nile valley which in course of time was broken down, so that the waters of the Kagera and other streams stretched eastwards in a vast backwater, which finds its most sluggish development in Kavirondo Gulf. The Sese Archipelago is within British limits, the other great islands or small islets of the Victoria Nyanza which lie to the south of the first degree of south latitude being within the German sphere. The Victoria Nile is the outlet of the Victoria Nyanza. It emerges from the lake over the splendid Ripon Falls, and flows most tumultuously northwards till it reaches a much lower level at Kakoge, and then becomes navigable for some distance northwards as far as the Karuma Falls, whence it turns westwards to the Albert Nyanza, descending nearly 1,000 feet at the great Murchison Falls. Between the Ripon Falls and the Karuma Rapids it has given birth to a great backwater lake with many islands and peninsulas, usually known as Kioga, with a northern extension named Kwania; this was originally christened Lake Ibrahim by its discoverer, the American explorer Chaillé-Long.

Victoria
Nyanza.

Lake Victoria lies at 3,720 feet above sea-level. It is consequently the highest of the great African lakes,

more elevated than Nyasa, Tanganyika, or the Albert Nyanza (which last is about 2,000 feet above sea-level). Except along its east coast, the land falls away from the rims of the Victoria Nyanza in all directions. It is therefore a shallow depression in a great elevated plateau which receives in the main the tremendous rainfall from the high mountains skirting the north end of Lake Tanganyika. The maximum depth of the Victoria Nyanza is probably not more than 270 feet, whereas in Lakes Tanganyika and Nyasa there are profundities of 2,000 and 2,500 feet. Lake Albert Nyanza is very shallow, with a maximum depth of only 55 feet. Nevertheless the Victoria Nyanza is not so dissimilar from Tanganyika in age and geological connexions as was sometimes supposed, when Tanganyika was found to possess a water-fauna which seemed to be of marine affinities, and peculiar to itself. Subsequently, through the activities of Mr. C. W. Hobley, who has been for many years a Government servant in East Africa and Uganda, and is still adding to our knowledge of East Africa, similar organisms were found in the waters of the Victoria Nyanza, while the actual marine origin of these and the similar shrimps and jelly-fish of Tanganyika is now disputed, though it is possible that in the Secondary Epoch the sea may have penetrated from the Indian Ocean to Lake Victoria, and again from Victoria to Tanganyika and the Albert Nyanza, leaving behind it the ancestors of the creatures whose origin and affinities have puzzled biologists during recent years.

About 140 miles to the west of the Victoria Nyanza rises a very remarkable mountain mass known as Ruwenzori. Although there are evidences of seismic activity (small cones of extinct craters, hot springs, earthquakes, &c.) on the slopes of Ruwenzori, the mountain mass itself consists mainly of archæan rocks. Its abrupt rise in the middle of a small depression is remarkable, for it would almost seem that at one time it was virtually a mountain island encircled by lake-like branches of the Nile, which may have united the existing lakes of Victoria, Edward,

Ruwe-
nzori and
the lesser
Nyanzas.

and Albert. These smaller Nyanzas—Nyanza is a widespread Bantu root for lake or sea—named respectively, by Sir Samuel Baker, *Albert* in honour of the Prince Consort, and, by Sir Henry Stanley, *Edward* (after King Edward VII), form two expansions of the great head-stream, or western, ‘Albertine’ Nile, the upper waters of which come from the vicinity of Lake Kivu in German territory, and pass through Lakes Edward and Albert, sheets of water much inferior in size to the vast Victoria Nyanza. The Albertine Nile between these two lakes is styled the Semliki, and for the northern half of its course constitutes the boundary between the Uganda Protectorate and the Belgian Congo. To the western banks of the Semliki (and across it up the west slopes of Ruwenzori) extends the great Congo forest. There are high mountains and plateaus—perhaps not more than 8,000 to 9,000 feet in altitude—rising out of this forest to the west of Lake Edward and Lake Albert. Lake Albert, in fact, except at its southern extremity, lies for the most part between cliff-like mountain-sides, and is consequently extremely picturesque. Ruwenzori, almost insulated by the shallow Lake Dweru, Lake Edward, the Semliki, and the Albert Nyanza, rises at its highest point to an altitude of 16,794 feet. There are other summits and ridges touching altitudes of 16,000, 15,000, and 14,000 feet, all of which are crowned with perpetual snow, the melting of which gives rise to glaciers, some of them of considerable size. These glaciers in bygone glacial periods extended down the furrows of this mountain mass to an altitude of only 7,000 feet above sea-level. The rainfall upon this wonderful mountain range (which is about 50 miles long by 30 broad) is very heavy, especially on its western side. It supports magnificent forests, and these contain a peculiar fauna and flora.

Buganda,
Bunyoro,
&c.

Between Ruwenzori and the coasts of the Victoria Nyanza the country is mountainous towards the south (Ankole), offering in many places superb scenery, in an alternation between forest of West African richness, exquisitely beautiful crater lakes filling up extinct craters

of vast extent, green downs, and granite mountain-tops and ridges. Farther east in Buddu, and especially in the kingdom of Uganda itself, the surface is really flat, and produces at most only lofty, beautifully rounded, verdant downs. For the most part the relief is hummocky, low hills of red clay alternating every mile or so with green swamps. In fact, throughout Buganda proper and much of Buddu there scarcely exists a river or stream with any sensible flow; nothing but the stagnant water-courses choked with marsh vegetation. As the traveller passes northwards from Buganda to Bunyoro these sluggish water-courses gradually free themselves from the choking vegetation and become slow-flowing rivers, which eventually feed the Victoria Nile or Lake Albert. The plateaus of Bunyoro—some of them densely forested—stretch westwards to the Albert Nyanza in increasing altitudes, and their sides drop abruptly to the shores of that lake, which really looks like a rift valley. The eastern province of Uganda, which includes the country of Busoga, is beset with many marshes, most of them backwaters of the Nile. The eastern part of the kingdom of Buganda, Chagwe, is densely forested, and one can realize that the whole of Uganda down to a few hundred years ago was little else than an eastern prolongation of the Congo forest, not entirely checked either by the course of the Victoria Nile, but extending across Busoga and Kavirondo till it connected with the vast Nandi and Sotik forests of British East Africa.

The confines of the eastern province brings the traveller up to the slopes of the huge extinct volcano of Elgon, which contains a great central crater. The walls of this crater rise in places to over 14,000 feet in height, and are constantly flecked or covered with snow. The view from the upper parts of Elgon is one of the most magnificent in the world. This mountain, indeed, must have played a great part in Central African history, being a beacon, as it were, to the enterprising semi-Caucasian raiders and traders of the north, visible as it would have been for a hundred miles or so, and beckoning

Mount
Elgon and
the Nile
province.

thirsty, famished men by its snows and forests to a region beyond the arid country of Northern Uganda. Much of the northern or Nile province of the Uganda Protectorate is inhospitable in its aspect, except in its southernmost district, Bunyoro. It is a stony country, permeated, however, by a few strongly flowing rivers, such as the Asua, the Ateppi, the Gomaro, and the Kos-Maluma, which are fed by the rains that fall on the lofty mountains. These mountains stretch at intervals for a considerable distance to the north-north-west of Elgon. In Debasien a height of about 9,700 feet is met with, and in Kamalinga 8,000, Chemorongi 9,300, Moroto 10,000—all these last in Karamogo; in Nakwai (Lobor) 6,000 feet, Morongole 7,500, Harogo 8,800, and Agoro 9,400. These mountains form at the present day the water-parting between the Mountain Nile lying far to the west, and Lake Rudolf to the east. It is believed, however, that at a not very distant period Lake Rudolf sent its waters to the Oguelokur or the Sobat, but at present it has no outlet. Its main feeder is the Omo on the north. The character of its fish shows that it once formed part of the Nile basin. On the other hand, the fish of the Victoria Nyanza have very little to do with those of the Nile, and have more affinities with the fish of Tanganyika. In the extreme north of the Uganda Protectorate, along latitude 4° 30', between Rudolf and the Mountain Nile, there are conditions almost as arid as those of the Sahara Desert, and this region is very sparsely populated. But in the Madi, Bari, and Lotuka countries, there is a regular rainfall sufficient for native agriculture, and a good deal of pasturage for cattle. Nevertheless, all the northern province of Uganda, except in Bunyoro, and actually in the valley of the Nile and the Asua, is a dry, bare region as compared to the wealth of vegetation in the remaining two-thirds of the Protectorate. The rainfall of Ruwenzori reaches probably to about 160 inches per annum on the west side, and 100 inches on the east side. The rainfall of the kingdom of Uganda itself varies between 60 and 75 inches per annum in average seasons.

Lake
Rudolf.

Aridity
and
moisture.

That of Busoga to the east, and Buddu and Ankole to the south-west, is about the same. The rainfall of the northern parts of the eastern province is an average 30 inches per annum, rising to perhaps as much as 60 in the vicinity of Mount Elgon. Along the actual course of the Nile to the Sudanese frontier the annual rainfall is an approximate 50 inches (rising to nearly 100 along the Semliki to the south). But away from the banks of the rivers in the northern province of the Uganda Protectorate the rainfall may drop to an uncertain 5 or 10 inches per annum in the desert regions, though much more falls on the crests of the high mountains.

The Victoria Nyanza, of course, is navigable for steamers of any dimensions, and is unsafe for small boats owing to violent tempests and the big waves that arise on its surface. Lakes Edward and Albert are likewise navigable, excepting the northern extremity of Albert, which is very shallow. The Semliki River is too much broken by rapids to be of use, except in its northern portion. The Victoria Nile is navigable for small steamers north of the Kakoge, and over much of the surface of Lake Kioga, and thence to the Karuma Rapids. Between Karuma Rapids and the Murchison Falls it is unnavigable; but at Fajao, below the Murchison Falls, the Victoria Nile is navigable into Lake Albert. Unfortunately the north end of Lake Albert is very shallow and is silting up, but directly the Mountain Nile narrows as it issues from the lake it is once more navigable to Wadelai and Nimule. Then comes a series of cataracts and rapids extending northwards for about seventy miles from Nimule to Rejaf, from which point onwards, especially from the frontier station of Gondokoro, it is again navigable right through the Egyptian Sudan, all the year round, to Khartoum and elsewhere.

Inland
naviga-
tion.

Over the greater part of the Uganda Protectorate there may be rain in any month of the year, owing to its equatorial position. The rainiest seasons, however, are perhaps from January to April, September to November. North of 3° N. lat., the rainfall is usually restricted to what we

Climate.

should term the summer half of the year, beginning in April and ending in October, the winter season being a period of almost unrelieved drought. In this northern part of the Protectorate the climate is extremely hot, especially in the actual valley of the Nile and away from the more elevated plateaus and mountains. The hottest part of the Protectorate is between the south end of Lake Albert and Gondokoro. Here, in the months of July, August, and September, temperatures of 112° F. in the shade are occasionally recorded. Within the kingdom of Buganda, however, the climate seldom goes to such extremes of heat, and is fairly agreeable all the year round, the average altitude above sea-level being at least 3,000 feet. Anywhere near Ruwenzori, even at no very great altitude, the climate is delicious. In the splendid forests of this region the traveller seldom feels the heat owing to the grateful shade. When the Ruwenzori region is connected by railway with the Uganda Railway and the chief centres of trade and administration (and consequently with the coast of the Indian Ocean), it will prove a delightful sanatorium: though for East Africa there are the mountain sanatoria, already made accessible, of Kenya and Kilimanjaro. The chief fault in the average climate of Uganda is the thunderstorms, which may occur in almost any month of the year and sometimes are of extreme violence, anywhere near the Victoria Nyanza. Lightning does great damage to buildings, and causes occasional loss of life amongst the natives, or even Europeans. But except for the germ-diseases, which are quite independent of climate, all this region of Central Africa may be regarded as healthy for Europeans, unless it be actually along the course of the Mountain Nile, where the great heat is occasionally unbearable.

Flora.

The flora of the Uganda Protectorate is of the highest interest, and displays an amazing wealth of genera and species. That of the kingdom of Buganda and of Ruwenzori is more West African than East African in its affinities. It is also closely related to the similar flora

of the Bahr-el-Ghazal. The flora of Ankole is of a more truly Central African character, more akin to that of eastern Tanganyika and Nyasaland. At elevations above 10,000 feet on Ruwenzori, Mfumbiro volcanoes, and Elgon there is the peculiar Alpine flora met with on Kenya and Kilimanjaro, on the loftiest points of the Aberdare range in East Africa, and—to a lesser extent—on the summit of the Kamerun peak in West Africa. This Alpine flora has affinities with both Abyssinia on the north and the mountains of Cape Colony on the south (Mounts Rungwe and Mlanje in North and South Nyasaland helping to link up the two last). Especially noteworthy in this Alpine flora of Ruwenzori-Kilimanjaro-Kenya (a flora which also extends to the loftiest volcanoes of Mfumbiro to the south of Ruwenzori in German territory) are the tree heaths (*Erica arborea* and *Philippia*), the giant groundsels (*Senecio Johnstoni*), and the giant lobelias (*Lobelia Stuhlmanni*, &c.). There are several species of everlasting flower, and there is a podocarpus on Ruwenzori, but there is no juniper there. Junipers are found on Elgon as well as on the high mountains of East Africa and Abyssinia, but do not extend further south or west. Besides many other West African forms, the forests of Buganda include the valuable *Funtumia elastica*, the rubber tree of Southern Nigeria, Liberia, the Gold Coast, the Kamerun, and the Northern Congo.

The fauna of Uganda is likewise of very great interest, Animals. partly on account of its West African affinities. Except, perhaps, in the more arid northern part between Elgon and the Mountain Nile, it lacks the vast herds of big game for which East Africa has become famous. Yet most of the East African antelopes are found to the north of Buganda proper, and to the south again in Ankole and Buddu. The white rhinoceros is met with sparsely on the western side of the Mountain Nile. The ordinary two-horned rhinoceros is found in Buddu and Ankole, and perhaps in the northern part of the central province, as well as between Lake Rudolf and the Nile. There are peculiar forms of the Cape buffalo in Ankole and Nileland,

and the dwarf red Congo buffalo extends its range to the Semliki forests and the vicinity of Lake Edward. In the northern part of the Uganda Protectorate the Abyssinian type of Cape buffalo is met with. In this region, also, between Lake Rudolf and the Nile, may possibly still be seen the big Grévy's zebra, but the common zebra of the whole Protectorate is that known as Grant's. Lions are still abundant in the less settled regions outside the forest. Leopards of the East African type are common everywhere. The leopard of the forested slopes of Ruwenzori is a peculiar variety or sub-species, more resembling the large-spotted leopard of India, or even the jaguar, in its bold markings. The remarkable okapi, a genus of the giraffe family, extends its range to the westernmost limits of Uganda in the Semliki forest. Giraffes of two or more sub-species are common in the northern part of the Uganda Protectorate, but are probably quite absent from Ankole, where, however, so much of the big game of East Africa reappears. Large chimpanzees related to those of the Bahr-el-Ghazal are found in the western part of the Uganda Protectorate. There are many remarkable monkey forms in this region, some of which are peculiar, others related to West African types. The West African short-tailed lemurs (*Perodicticus*) are likewise found here, as well as the West African type of porcupine (*Atherura*).

Birds.

The birds of Uganda are likewise of West African affinities. Here may be seen the splendid giant blue turaco, the violet plantain-eater, and the grey parrot of West Africa. The ostrich is only found in the north. The whale-headed stork is a native of this region. A few of the birds, like the large long-tailed widow bird (*Chera*), are more of South African affinities.

Reptiles and fish.

As regards reptiles, there is a peculiar species and a peculiar genus of chameleon on Ruwenzori. Most of the West African snakes are found here, as well as the East African. There is only one species of crocodile, however—that of East Africa and the Nile. Amongst remarkable fish are the mud-fish or *Protopterus* (of the order *Dipnoi*), one or more species of *Polypterus* (*Crossopterygii*—Ganoids);

in the Nile waters only, the electric catfish (*Malopterurus*), giant catfish (*Clarias*), and the large salmon-like *Hydrocyon*, with tusk-like teeth. The fish of the Victoria Nyanza—though abundant in numbers—are poor in species compared to the fish-fauna of the Albertine and Mountain Nile and of Lake Rudolf.

The human races of this Protectorate may be divided into pygmies, forest negroes, and the Nile negroes; but special attention should be directed to the Hima aristocracies found in so many of the states, which are negroid rather than negro, and betray marked affinities with the Gala. The Congo pygmies just extend their range to the Semliki River, but some of the tribes of the Ruwenzori forests (such as the Ba-amba), the people of Chagwe (East Buganda), and of the western slopes of Mount Elgon show obvious signs of relationship with the pygmies. The forest negroes are related to the pygmies in points of structure, but attain to a much taller stature. Like them they are remarkable for their disproportionately short legs. The Nilotic negroes, on the other hand, are noteworthy for their tall stature—those along the western shores of Lake Rudolf (Turkana) are positive giants, the men being frequently seven feet in height. Both men and women amongst the Nilotic negroes are not only tall but have disproportionately long legs, as contrasted with the very short legs of the forest negro. In course of time the two types have blended and have produced an average East African type of negro which speaks a Bantu language. The natives of the kingdom of Buganda are of this average type, usually well formed and with pleasant faces, distinctly negro, but not of the ugly negro type, and of course black-skinned. Most of the Nile negroes are black-skinned. Some of the pygmies and the forest types are rather lighter in skin-colour, and the Hima aristocracy of herdsmen and cattle-keepers (which has furnished several of the Uganda states with dynasties of chiefs and kings) are sometimes so light in skin-colour as to be mistaken for Galas or Egyptians. Except that their hair is more like the negro wool, these people of Unyoro, Toro, Buganda,

Ethno-
logy.

and Ankole might, in fact, be mistaken for Somalis or Galas. But they are big men and fine-looking women, with bodies which are well-nigh perfect from the sculptor's point of view. The Hima people of Ankole (and formerly elsewhere) were like the Nilotic peoples further north and the Masai of East Africa, in that the men went about absolutely nude. Amongst the Nilotic tribes of Northern Uganda the women (as also in Kavirondo) were equally naked; but the Hima aristocracy was always careful that its women should be scrupulously clothed, however the men might scorn any coverings, except such as were adopted for warmth.

Early
settle-
ment.

At some period of uncertain remoteness—perhaps 2,000 years ago or more—the well-watered fertile lands of Uganda were permeated by wandering hunters and herdsmen from the north, people of Gala or even ancient Egyptian or Abyssinian race. Some may have come there as traders. In any case, these semi-Caucasian immigrants were received by the forest negroes as demi-gods and gradually assumed that position in their legends. They are reported to have brought with them cattle, dogs, sheep, and goats, and most of the arts and industries. Although the Uganda Protectorate was much cut off from the Egyptian Sudan by the extensive marsh regions of the White Nile, it was more in touch with Abyssinia and Galaland by the route starting northwards from Mount Elgon. From time to time ancient beads are dug up, to which a superstitious value is attached, and which seem to have come from Egypt at a remote period. Otherwise, Uganda may be said to have been out of the current of human history until the middle of the nineteenth century. It was not till the first quarter of that century that the newly-established dynasty of Muhammad Ali in Egypt thought of penetrating far up the Nile. The steamers of this Egyptian Pasha reached as far south as Gondokoro in 1842. An Egyptian outpost was established by an English Governor (Sir Samuel Baker) at Gondokoro in 1871. Nothing, however, was known of Uganda by the civilized world till Burton and Speke heard of that country through the

Penetra-
tion from
Egypt.

Swahili Arabs in 1858. Speke entered Uganda with Grant in 1862. General Charles Gordon attempted in 1875 to extend Egyptian influence over this region, and sent there for that purpose two envoys, Colonel Chaillé-Long, an American officer, and Linant de Bellefonds, a Belgian. Sir John Kirk, at Zanzibar, however, for very good reasons, objected to the indefinite extension of Egyptian and Muhammadan influence in these directions, and intervened to save Uganda from incorporation in the Egyptian Sudan. About the same time the great explorer Stanley had revisited Uganda and had made the acquaintance of the same remarkable chief or emperor, Mutesa, who had not been long on the throne when Speke and Grant discovered the course of the Upper Nile. Sir Samuel Baker had discovered the Albert Nyanza, but had been too much harassed by the cruel King Kamurasi of Bunyoro (Unyoro¹), the region to the east of Lake Albert, to attempt much exploration of that region. Bunyoro, which for some reason detested the white man, barred the way for several decades to an Egyptian approach towards Uganda. Nevertheless, Stanley's description of the country in the columns of a London newspaper, of which Sir Edwin Arnold was one of the enthusiastic leader-writers, provoked the dispatch thither of an important body of missionaries emanating from the Church Missionary Society. These missionaries reached Uganda along Speke's route from the south. They were followed some years afterwards by a body of French missionaries, the White Fathers of Algeria, founded by Cardinal Lavigerie. The result of the work of these missionaries was that after Mutesa's death, in 1884, a considerable proportion of his more influential people were either Catholic or Protestant Christians. Meantime, the

Missionaries and Arab influence.

¹ The reason why so many Central African country names were first commenced by a *U*, and are now prefixed by *Bu*, is that early explorers adopted the renderings of the Zanzibar (Swahili) interpreters, and that the Swahili language softens the initial *Bu* into *U*. The prefixes most in use in this part of Central Africa are *Mu*- (sing. = one person), *Ba* (plur. = people); *Bu*- = the country; *Lu*-, the language: -*ganda*, -*nyoro*, -*soga*, &c., being the unchangeable root

Muhammadan colony in the country had been multiplying through the ever-increasing trade conducted by the Arabs of Zanzibar. After Mutesa's death Arab influence got the upper hand. The missionaries were alternately expelled and recalled, and revolutions shook the native kingdom to its foundations.

Inclusion
of Uganda
in the
British
sphere.

The Anglo-German Agreement of 1890 had brought Uganda within the British sphere, though it had narrowly escaped being annexed by the king of the Belgians and added to his Congo sovereignty. The downfall of Egyptian authority in the Sudan had caused Emin Pasha, the southernmost of the Egyptian officials, to rule for a short time on the banks of the Mountain Nile and on the Albert Nyanza. He, however, was brought away by Stanley's expedition (which came via the Congo) in 1889-90. At the request of the British Government and the missionaries, the Imperial East Africa Company extended its influence to Uganda, and sent thither several officials to open up relations with the king (Mwanga). The most noteworthy of these were Sir F. J. Jackson and Sir Frederick Lugard. This last, with a small force, intervened in the terrible bloodshed and civil wars which were rending this kingdom into fragments, and established British authority there about the year 1898. The expense of this work proving too great for the resources of the Company, he was recalled. A British mission was sent out under Sir Gerald Portal, and on its report the British Government decided to assume direct authority over Buganda, and finally to build a railway thither from Mombasa. Under various commissioners it became absolutely necessary for the welfare of Buganda to subdue the hostile people of Bunyoro, who under Kabarega, the successor of Kamurasi, made life intolerable for all tribes along their frontiers. Sudanese soldiers were imported to combat the warlike natives of these regions, and there being no counterpoise to their armed strength, they took occasion to mutiny in 1897 and killed several of their officers. Under General (Sir) J. R. L. Macdonald the back of this mutiny was broken, though the mutineers

were not finally disposed of till the work of Colonels John Evatt and Delmé Radcliffe in 1900. In 1899 Sir Harry Johnston was sent out as Special Commissioner and Commander-in-Chief. The affairs of the whole Protectorate were brought into order, treaties were concluded with all the principal chiefs (the status of most of these being duly defined), the King of Buganda was styled His Highness the Kabaka, and since that period (1900-2) the Protectorate has been perfectly peaceful. Its boundaries, between 1899 and 1901, were extended westward to the Congo frontier (Toro and Ankole), northward to the Sudan frontier (5° N. lat.), and east to Lake Rudolf.

Its prosperity has since advanced by leaps and bounds but for one unlooked-for episode—the ravages of the sleeping sickness. This terrible disease (due to the increase of a trypanosome flagellate in the blood, introduced by the puncture of a tsetse fly) at different periods (traditionally since the thirteenth century) had ravaged the whole of West Africa from the Senegal and Liberia to the eastern limits of the Congo basin. Intercourse between the Belgian settlements and the Congo Forest and western Uganda brought this infection in its train, and between 1902 and 1912 the mortality of the negroes, chiefly in Buganda and Busoga, from sleeping sickness has been terrible. The fly infested most the actual shore-line of the Victoria Nyanza, especially where there was dense forest. It was markedly abundant on the Sese Islands. In two or three years this archipelago was absolutely depopulated. The only way of checking the disease was by inviting the natives to leave the shore-line of the Victoria Nyanza, and by cutting down the forest as much as possible. Other measures are limiting the disease to a certain extent, but it will be long before it is got rid of altogether, and as Europeans are liable to the bites of the tsetse as well as the natives (though offering a less exposed surface to the attacks of the fly) their lives are threatened as long as these germ-diseases remain incurable and unpreventable. In spite of this epidemic, however, the population of Uganda, with a few fluctuations, has

Sleeping sickness: mortality and effect on settlement.

probably not much decreased since the British occupation of the country. It now stands at about 2,800,000.

Native
culture.

The kingdom of Buganda when first visited by Europeans struck them as being extraordinarily civilized for Central Africa. Well-made roads went from village to village. The villages were clean and well-ordered. The people were scrupulously clothed as compared to the naked negroes in the regions beyond their limits. They were exceedingly polite, but their religion was a cruel one, demanding constant human sacrifices. Their adoption of Christianity was remarkable in its suddenness and completeness. They retain all the good qualities for which they were formerly celebrated, but, unfortunately, from a variety of causes, are either stationary or actually decreasing in numbers. This comparative sterility amongst the Baganda (as they are styled) has long been noted by themselves, and was one of the reasons why in the days of their former power they perpetually raided the surrounding countries for slave wives, as the women of Buganda tended markedly towards infertility. Outside the kingdom of Buganda and the province of Busoga there is not much evidence of the ravages of sleeping sickness, and the populations under the supervision of the British Government are steadily increasing.

Education
and
religion.

The Baganda proper are eager to become educated and apply themselves to the learning of reading and writing with a zest which is almost pathetic. So far, education is entirely in the hands of the missionary societies (one Anglican, two Roman Catholic). In the outlying regions, of course, a great many pagans still remain attached more or less to the old fetishistic religions. The Nilotic negroes in the north have very little religion at all, only a vague belief in a god of the sky and in the power of magic ; but there is still a strong colony of Muhammadans within the kingdom of Buganda ; and all along the Nile Valley from the Albert Nyanza to the Egyptian frontier the people are nominally Muhammadans, constituting, in fact, that mass of Sudanese negroes from which such splendid soldiers are drawn, not only for the Anglo-Egyptian

Government, but for the police of the Uganda Protectorate. A small force of Sikhs, however, and some negro troops from Central Africa, assist to garrison the kingdom of Buganda.

The administrative capital of this country is Entebbe, a beautiful place on the north coast of the Victoria Nyanza. Twenty miles to the north of this lies Mengo—often miscalled Kampala, from one of its suburbs—the great native capital where resides the king or kabaka of Buganda. The native government of this region is administered by a regency till the king attains his majority. The government is constitutional, with a parliament or *lukiko*. Besides Entebbe and Mengo there are other important centres of trade and government, such as Jinja, near the outlet of the Victoria Nile (Busoga); Fort Portal, near the north end of Ruwenzori; Mbarara, the capital of Ankole; Hoima, in Unyoro; Muruli on the Victoria Nile; Wadelai, Nimule, and Gondokoro on the Mountain Nile. Since the British Protectorate was well established numbers of English traders have entered the country. There are also English, German, and Italian trading houses. The leading exports of Uganda—only developed within the last few years—are rubber, hides, ivory, cotton, ground-nuts, coffee, and cattle. The total value of the export trade with the outside world in the year 1911 amounted approximately to £392,000, and in imports to £625,000. The revenue of the country during this period was £203,500, and the expenditure £382,000, the deficit being made up by a grant from the Imperial Government. There are indications of gold in Bunyoro, and perhaps in the northern regions of the Uganda Protectorate; abundant iron is found also in Bunyoro, while in the central part of the Protectorate there is copper, but at present there is no mining industry, the exploitable wealth of the country being either vegetable or animal. As a coffee- and cotton-growing, rubber-producing country Uganda offers prospects of considerable success; but owing to its lower general level in altitude, and consequently much hotter, wetter climate than that

Adminis-
trative
and
trading
centres:
com-
merce.

of East Africa, together with its more abundant native population in the favourable regions, its future will be rather that of a black man's than of a white man's country. There are regions in Ankole which seemed a few years ago eminently suited for European colonists, but since then the native population has begun to occupy them.

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A great deal of information as to the suppression of the slave-trade and the gradual creation of British Protectorates and spheres of influence in East Africa will be found in the Government Blue-books published at intervals between 1830 and 1908; especially during the period between 1889 and 1903.



PLATE XV. BACKWATER OF VICTORIA NYANZA, UGANDA
(Sir H. H. Johnston)



PLATE XVI. SOMALILAND : CHARACTERISTIC STONY AND THORN COUNTRY
(Sir H. H. Johnston)

CHAPTER XIV

BRITISH SOMALILAND

BY H. O. BECKIT

THE British Somaliland Protectorate includes all the Extent. parts of the northern coast of the so-called 'Horn of Africa' and its hinterland that lie west of the 49th meridian, which the frontier follows from the sea as far inland as 9° N. lat., thence continuing straight to 8° N., 48° E., and then passing along the 8th parallel to 47° E., and still almost wholly by straight lines, successively west-north-west, north-west, and north-east, to the sea again close to the Gulf of Tajura. It is thus a section, about the size of England and Wales, arbitrarily cut out of the great triangular Somali peninsula, which in many respects forms a continuation of Arabia, and, in point of view of structure, of the Indian Deccan as well.

The peninsula has a general south-eastward slope, with Structure. its greatest heights close along the northern edge; broadly it would seem to be a great block of the earth's crust, slightly tilted so as to stand highest in the north and west, and bounded by a series of fractures to north, north-west, and south-east. The irregularities in its surface, whether due to interior dislocations or to the varying local effect of water, wind, and weather, have been considerably reduced by infilling of depressions through the want of a system of perennial rivers to transport the waste of the land to the sea.

Both the hydrography, and the geology so far as it is Geology known, of the British portion of Somaliland will be more and relief. easily understood in connexion with a brief statement of the main features of the relief. It should first of all be noted that in this, the higher part of the crustal block summarily described in the last paragraph, the range in altitude is much greater, and the master lines of mountain and lowland more nearly approach a west and east

direction than further south. There is in fact a series of belts of country, roughly parallel with the coast, which can be most fully made out by making a traverse southward from near Berbera. Here the succession is as follows :

Zonal distribution of surface characters : the Guban.

1. A narrow coastal plain, sandy or pebbly—much of the sand being the waste of a slightly uplifted coral reef—gently rising to 300 or 400 feet above sea-level. This is of recent formation, and broken in places by low hills of limestone and chert which have been regarded as of Cretaceous and possibly Eocene date.

2. A maritime range, reaching 1,500 feet and more, formed of Cretaceous limestone dipping to the south.

3. A series of aggraded basins with alluvial deposits, in which streams wind in broad sandy beds.

4. Another belt of hills, usually from 2,000 to 3,000 but in places 4,000 feet high, of gneiss, partly overlain by Jurassic limestone which also has a general southerly dip ; the more rugged summits are in the crystalline rock. In both this and the outer maritime range the valleys are mostly steep-sided, boulder-strewn, and often difficult of passage.

5. A more elevated terrace, forming plains higher than (3) but lower than (4), in part alluvial.

Nos. (1) to (5) are known as the *Guban* (i.e. burnt), and are here from 30 to 35 miles wide, but narrowing to a mere strip less than 2 miles wide before the eastern frontier is reached.

The Golis range.

6. Steep rise to a crest, here called the Golis range (5,000 to 6,000 feet), dissected by gorges and gaps which form routes to the interior, and here and there broaden out into enclosed upland plains. In front of the actual crest runs a stony ledge, a mile or two wide, covered with a thin soil, and known as the *Mirso* or 'haven'. The lower slopes of this rise are in Archaean gneiss, with dykes of pegmatite ; schists and granitic rocks also occur, the latter outcropping in isolated peaks as much as 5,000 feet above the sea. The top of these old rocks corresponds generally with the *Mirso* ledge. Immediately overlying them is

a thick Eocene ('Golis') series, beginning with red and purple sandstones and conglomerates containing iron (about 800 feet), succeeded by thin shale and then by a cave-forming limestone (about 250 feet thick).

7. Terraces known as *Ogo*, with a relatively gentle fall towards south and south-east, apparently everywhere underlain by the upper Golis limestone, whose somewhat irregular surface is often masked by a thin cover of sands, clays, and gypsum. ^{The Ogo.}

The terraced descent northward from the crest about Hargeisa further west forms a much dissected series of plains, known from their generally transitional character as *Ogo-Guban*. ^{Ogo-Guban.} The soil here is often rich and dark with vegetable humus; the descents to the dissecting valleys are steep, and the intervening uplands often rocky.

7a. Somewhat further to the east there begins a continuous depression with a very slight slope towards east-south-east and a mean altitude of about 3,000 feet, intervening between (7) and (8), where absolutely no bed rock outcrops. The eastern half of this depression forms the Nogal valley, 50 miles north of which the head only of the not dissimilar Darror valley lies within British Somaliland.

8. The *Haud*, a great rolling plateau, almost waterless in the dry season, and passing far beyond the southern boundary of British Somaliland, with subsidiary hills rising from it, the Bur Dab, for instance, and other ranges along the southern edge of the Nogal; but these are sometimes only outliers formed by erosion out of the higher parts of the plateau. The Haud is almost entirely if not wholly underlain by the Golis limestone, and usually has a reddish sandy or clayey soil. What is really a detached portion of the Haud, equally poorly watered, but stony, lies between the Darror and Nogal valleys, and is properly known as the Sorl. ^{The Haud.}

The geology of the north-eastern region is undetermined; it seems probable that the limestone is there appreciably thicker, but that some of the stratigraphic elements of the western and central maritime belts are

here submerged beneath the sea ; the external ranges and plateau scarp are all squeezed against the coast.

Oro-
graphic
features.

One or more of these orographic elements may be missing on parallel traverses made further east or west, yet along any meridian there is to be found a coastal lowland of no great width, backed by a somewhat undulating table-land from which it is parted by a steep scarped slope corresponding with a geological fault that forms the topmost and biggest step of a series descending to and beneath the Gulf of Aden. Other faults probably occur along the seaward face of the maritime and other ranges of the Guban ; these form the risers to lower steps in the same great staircase, the backward sloping treads of which have been partly flooded with rock waste from above. The crystalline substratum of belt (4) appears to be a detached portion of the Archaean rocks of the Golis scarp, let down by faults. The crest of this eroded fault-scarp reaches altitudes from 4,000 to 7,000 feet and runs right across British Somaliland and beyond it, both eastward with some decline in height to Cape Guardafui, and westward, where it joins the higher, largely volcanic plateau of Harrar (Abyssinia) ; similar volcanic rocks, probably of Tertiary date, occur in the extreme west of British territory, and now form tabular hills bounded by cliffs with heavy screes at their foot and a rugged surface. These extrusive rocks can be connected with the fractures and founderings which, as has been already stated, terminate the Somali plateaus to north and north-west.

Hydro-
graphy.

The drainage, though incomplete by reason of the very low rainfall, follows three main directions : (1) down the main scarp slope by many parallel courses perpendicular to the northern coast, which is not, however, always reached by any surface stream in each wadi (in Somali, *tug*) ; (2) usually rather east of south down the inland slopes of the Ogo in lateral valleys which cut the high land into blocks ; (3) along the plateau somewhat south of east in the axial Darror and Nogal valleys, which open out, but do not carry continuous rivers, to the Indian Ocean.

There are, indeed, no permanent rivers in British

Somaliland ; the coastal scarp streams (1), and the lateral drainage (2), towards the two axial depressions (3), form torrents which only flow seasonally and in dwindling volume to varying distances from their source before they are lost by evaporation or by percolation underground. The same fate overtakes even the Tug Der (or 'long wadi'), which after the rains gathers great part of the lateral drainage, including some from the southern Haud, and in consequence floods its aggraded bed, but rarely if ever flows as a surface stream into the lower Nogal valley, which is its direct continuation. The longest of the lateral wadis is the Jid Ali or Durrero Tug, leading to the Nogal across the Sorl, down the inward slope from the Warsangli plateau crest (an eastward continuation of Golis, here called the Hadaftimo Mountains) near to long. 48°.

For water-supply, however, the whole of the running streams would be hopelessly inadequate : they are supplemented by rocky pools in the ranges, by clay-floored pans called ballis in the lower interior plateaus, which hold rain-water perhaps for a month or two, and by more or less permanent wells where ground-water can be reached. Great care is commonly needful to avoid penetrating the clay bands in the alluvial deposits where many of the wells and ballis occur, so as not to let the water which the clay holds up waste itself in the underlying sands. Even on recognized caravan routes dependable wells are often spaced very far apart—sometimes as far as 100 miles. A good deal of the well water, especially that from gypsum rock in the Nogal Valley, is impregnated with sulphuretted hydrogen, though exposure to light and air largely does away with the smell and flavour ; the tainted water is thought to be all the better for stock. Ground water in the maritime plain, where surface streams often fail to reach the sea across the recent sand and alluvium, is brackish : Berbera, for example, draws a supply of somewhat better quality through a pipe-line 7 or 8 miles long from the maritime hills at Dubar.

The predominant feature of the climate is dryness : it

Water-supply.

Climate :
rainfall.

is generally hot, but except during particular seasons in the coastal lowland, not unhealthy. The complete lack of long-period observations very much reduces the significance of any numerical values that can be quoted for the rainfall, but it can safely be asserted that, as is common in generally arid regions, the amount is not only slight but also exceedingly variable. On the coast, where in other respects too the closest approach is found to true desert climate, the precipitation will not exceed 3 or 4 inches annually—setting aside exceptional years—and is frequently much less: in the high plains (Ogo) near the Golis range it seems to be something over 10 inches, generally more in the mountains, but less again as we pass into the Haud. On the whole, rainfall diminishes also from west to east, but is particularly variable, both locally and from year to year, in the usually drier eastern districts.

Tempera-
ture.

Trustworthy statistics of temperature are also deficient, but the mean daily range, even on the coast, is almost as great as the mean annual (i.e. the difference between the mean temperature of the hottest and the coldest month): in the higher interior, which usually has much lower temperatures, the daily range is considerably greater—especially where the surface is bare of vegetation. Even in the interior, however, maximum temperatures are occasionally very high, particularly during the prevalence of sand-storms: altitude reduces the average values, but this is sometimes compensated by loss of the moderating influence of the sea.

A few approximate figures, all according to the Fahrenheit scale, may be given for what they are worth. Air temperature in the shade along the coast may exceed 110° about September, and minima as low as 60° are most exceptional: the higher plains of Guban are even hotter. In Ogo-Guban the extreme range lies between 50° and 100° : at Sheikh, in an upland plain near the seaward edge of the high plateau, minimum values of 40° in the cool, and over 65° in the hot season, against maxima of rather under 80° and just over 90° respectively, have been registered; while in the Haud the highest figures may

rival, and the lowest will be only a little lower than those of the coast. Nowhere except in the maritime ranges or plateau crest of the north-east does the temperature seem to fall below freezing-point (to about 25°).

Seasonal distribution of the climatic elements is also Seasons.
not quite the same on the coast and inland. A monsoonal type of wind movement prevails, the year being divided into four (or five) unequal periods, thus :

(1) *Jilal* or dry season, from about the middle of January to March or April : the latter part of the north-east monsoon—mostly a steady breeze.

(1a) *Kalil*, calm and sultry, corresponding with the change to the south-west monsoon, about April.

(2) *Gu*, fertile and rainy, bringing the first rains at the beginning of the less regular south-west monsoon : properly in May and June, but often earlier in the interior.

(3) *Haga* or hot season, July to October, with continuance of largely thunderstorm rain in the interior.

(4) *Dair*, a relatively cool season, about November to early January, with the second rains brought by the early north-east monsoon : in the interior these second rains rather belong to an earlier season, that of the departing south-west monsoon.

The south-west monsoon, or *karif*, prevails from May The
to September, gradually changing to north-west in the monsoons.
extreme west : it is accompanied by frequent mists in the interior, and along the coast by calms and squalls, increasing in force until August, and generally unfavourable to navigation by native sailing boats, which are regularly laid up—except for coastwise traffic west of Berbera—during this dangerous time of *Bat Hiddan* (i.e. sea closed). From November to March the sea-breezes of the north-east monsoon prevail, and sailings east of Berbera and across the Gulf are renewed, this period being known as that of *Bat Furan* (i. e. sea open) : wind direction becomes east or even south-east in the extreme west. It is at the beginning and end of the *karif* season that the climate of the coastal districts grows oppressive and somewhat unhealthy. Strong winds, of gale force in the Haud,

generally blow over the interior during the middle and later part of *Haga*. All the time that the *karif* wind blows, violent sand or dust-storms are a frequent and unwelcome feature right down to the coast, though they are said to be inimical to the fly and mosquito pests, as well as to nobler animals.

Seasonal
rainfall.

The high temperatures over the land reduce the precipitation that would otherwise be produced during the period of sea-breezes, and, in the interior highlands especially, the rains are essentially summer rains whose incidence corresponds with, but rather lags behind, the attainment of maximum altitude by the sun in its apparent northward and southward oscillation. The sun becomes vertical at noon over British Somaliland during April and August ; and it may be noted that farther south the seasonal rains are more fully identified with the double passage of the equatorial belt of calms and predominant convection currents : in the northern or British area there is a combination or transition between this equatorial arrangement and the special régime of monsoonal winds alternately on and off shore.

Vegeta-
tion :

The universally low rainfall, conjoined with high temperature and the prevalence of limestone and other permeable rocks, gives the vegetation a characteristically scanty, semi-desert aspect. There are minor distinctions depending on soil and ground-water, and the combined result is an alternation of scrub and savanna with occasional jungle and absolute desert, and a notable general tendency to a thorny or spinous habit in many plants. The main features of the distribution can only be given here in a generalized form, in connexion with the surface divisions already enumerated.

of the
maritime
plain,

The seaward edge of the maritime plain is bare, but its inner portion carries thornbush, notably *khansa* (*Acacia nubica*) and *kidlhi* (*Balanites aegyptiaca*), and some grass. The maritime ranges are brown and sterile, in their higher parts bearing only low scrub, but in the intermont plains dense thorn jungle and reedbeds follow the sandy stream beds while the often stony divides between the water-

courses are covered with low acacia and occasional coarse grass : where there is shade in deeper ravines among the hills, and pools at least of water throughout the year, several varieties of wild fig grow : many trees support creeping vines. Dense jungle or low scrub with grasses and flowering plants occurs on the higher ranges of the great scarp, with real woodland on the actual crest, as in the woods of box and cedar—Burton's 'Somali pine' (*Juniperus procera*), called *deiyib* by the natives—of the Mirso, the table-lands of Ogo-Guban, and Golis ; and the best grasslands, together with the most varied flora in the country, are found here and in the Ogo. The useful gum, myrrh, and frankincense trees, which led the ancients to name the country *Regio Aromatifera*, grow mostly on the higher slopes and plateaus hereabouts and in the maritime hills ; the gum resins classed as bdelliums, in the Haud and interior valleys as well. Much of these high lands about the great scarp has a characteristically park-like aspect.

The plateau further inland, including the Haud, is either almost impenetrable thorn jungle, including many acacias with an undergrowth of aloes, of which the finest is of the species known as *hig* (*Sansevieria ehrenbergii*), varied by strips of grassy plain or *bans*, or else barer desert (locally called *aror*). In the depressions like the Nogal, trees and bushes are usually more open and rather less thorny : the trees commonly grow along the banks of water-courses and at the margins of what are flooded lands after the rains. The grasslands of the far interior have frequently sprung up on burnt-over stretches of the thorn bush. The best of the grasses is called by the Somalis *daremo* (*Andropogon* or *Chrysopogon aucheri*), grows a foot or more high, and never quite withers up ; next in value is the shorter *dihe* (*Sporobolus somalensis*) ; the coarser kinds like *durr* (*Andropogon kelleri*), 4 or 5 feet high, are most useful as fodder for camels, which also browse on many of the bushes and shrubs. In some of the valleys palms, including the date, and fig trees grow locally, and there is a number of characteristic ground creepers in the inland regions.

of the
inland
plateau.

Several species of cactus are common, and the giant euphorbia called *hassadan* reaches a height of 60 feet in Golis and elsewhere.

Fauna.

The wild fauna is naturally more numerous, and also more varied, away from the coast and beyond the British southern frontier; but even in the maritime tracts of Guban the pasture provides food for a large wild ass and for several species of antelope, including the little *dik-diks* (*Madoqua phillipsi* and *swaynei*—*M. guentheri* is confined to the Haud), oryx (*O. beisa*), and Soemmering's gazelle, both extending throughout the country, as well as the lowland gazelle (*G. pel-elni*, replaced by Speke's gazelle beyond the maritime hills), and, about the rocky hills, the beira (*Dorcatragus melanotis*). Hares, and several species of sand-grouse (*Pterocles*), bustard, and francolins, with occasional ostriches, are also found over the maritime tracts. Farther into the high land occur hartebeeste (*Bubalis swaynei*), the giraffe-like gerenuk or Waller's gazelle (*Lithocranius walleri*), the nimble klipspringer (*Oreotragus saltator*), greater and lesser kudu (*Strepsiceros*), together with wart-hog everywhere near water, and troops of baboons along the mountains. Smaller mammals include mongooses, a ground squirrel, a rock rabbit, and peculiar varieties of small rats and mice. Birds are numerous, among them turtle- and ring-doves, green pigeons and parrots, starlings, hornbills, woodpeckers, and common quail. On the lower inland plateau of the Haud and Nogal we have to add the dibatag or Clarke's gazelle, not quite so long-necked as the gerenuk, to most of the graminivorous animals already mentioned.

Preying on these creatures, or at any rate upon most of them, and on the flocks and herds belonging to the Somalis, a varied collection of carnivores exists, among which the lion, leopard (three species), lynx, serval and civet cats, both striped and spotted hyenas, jackals, and foxes should be mentioned. A good deal of the extension of our knowledge of the country during the later years of the nineteenth century was in fact due to the temptations it offers to big-game hunters: but its repute with them was

already somewhat waning before it became very largely a closed land as a result of the British withdrawal to the coast : the elephant, for example, seems to be suffering gradual extinction, or expulsion to the less accessible lands farther south.

Insects of certain kinds are only too numerous, e. g. ^{Insects, &c.} mosquitoes (both *stegomyia* and *anopheles*), ticks, blood-sucking horseflies—with allied camel and dog parasites—and locusts. The last-named often furnish the food for the common marabou stork, when carrion is not to be had. There are also scorpions, and some very large spiders ; and the nests of termite ants built round dead trees and bushes, whose general shape they follow, are a characteristic feature in many views.

Economic geography can be very briefly discussed for ^{Economic} a country whose people are still in the nomadic pastoral ^{geogra-} stage of development. ^{phy.} Incidental treatment of their pastoral activities will be found farther on. There is, indeed, a little scattered agriculture, mainly of millet (*jowari*) in and around the towns and *tarikas* (below) ; but Mining and Manufactures are alien terms quite out of place if applied to the small home industries carried on by the Somalis and especially by certain semi-servile tribes. For these minor items in the life of the people, reference should be made to the sections dealing with the tribes and their social culture.

Methods of transport are primitive, but vitally im- ^{Communi-} portant in the economic and social conditions prevailing. ^{cations :} Like nearly all of the facts connected with human ac- ^{on land.} tivities in this country they show strikingly a process of natural development and adaptation to physical conditions hardly less complete than that illustrated by the lower life-forms. So long as transportation continues unreformed, order and progress in a Western sense cannot possibly begin : the relative decline of the trade of the port of Zeyla since the French railway from Jibuti was opened furnishes an instructive lesson.

Not only is there no railway, built, building, or actually projected, in the whole of British Somaliland, but there

are not even roads in any proper sense : the nearest approach to one is the rough track, in parts fit for wheeled traffic, constructed during the military operations of 1902-4 between Berbera and Bohotle by way of the Sheikh pass across the great scarp ; but of this only the steep sections through the ranges were permanently improved. Traffic still finds a much easier means in pack animals, mostly camels, which can pass everywhere except where they are confined to defiles in the ranges, or through the thorn bush, where narrow clearings have to be made. Camel caravans regularly make one journey to the coast annually from places far beyond British territory, two or more from points north of about the seventh parallel ; they commonly do from 15 to 25 miles in a day's journey of 7 or 8 hours, halting during the middle of the day, or marching only at night, to avoid the heat. A Somali camel's load may be taken as from 2 to 3 cwt. : the best come from the eastern districts, the rugged volcanic country that occurs in the west being unfavourable to these animals, so admirably suited to the service of man in the semi-desert plains of the interior. Rather undersized donkeys are similarly employed to a much smaller extent, mules still less ; and the Somali uses his hardy pony entirely for riding, notably on tribal raids and for hunting. Camels are never ridden by adults in health. The clayey bottoms of the interior become so heavy during the rains that travel is in places then almost impossible.

Oversea
communi-
cations.

As previously explained, there is a regular trade, coastwise and across the Gulf, particularly to and from Aden, in sailing boats called buggalows, belonging to the natives, and in dhows of between 50 and 300 tons from Basra and Red Sea ports ; but this traffic is partially suspended during *karif*, and a great deal of the Aden, together with the rest of the foreign trade, is carried on in steamers, nearly all British. Country craft also engage in the pearl fisheries, both locally and even as far off as the Persian Gulf.

The 440 miles of coast are low and swampy in the

extreme west, with shoal-water reaching far off shore, afterwards becoming sandy ; but beyond Berbera the hills and bluffs approach and sometimes actually reach the sea ; there are, however, no considerable indentations to form good harbours. Though there are few or no offshore obstacles to navigation—Meit or Burnt Island, about long. $47^{\circ} 15'$, and affording some shelter from the eastward, is practically without a fellow—inshore reefs, commonly of coral, obstruct some of the minor anchorages. Tides only rise from 5 to 9 feet, so that passage over them is not open for vessels of any size. Breaks in the coral reef generally indicate an outflow, not very far below sea-level at any rate, of land water, the presence of which has no doubt attracted the population often found at these points, as well as made them comparatively accessible from the sea.

Save for Zeyla in the far west, on a low mudbank, ^{Berbera} which at high tide forms an island behind a hooked spit, ^{port.} but shallow and reached by a somewhat awkward passage, the only sheltered harbour is at Berbera, at the back of which a number of more or less practicable passes leading to the interior exist. Here a recurving sand spit, resting on coral, and a mile and a half long, continues the line of the coast farther east and encloses a deep bay, open only to west-south-west, and with good anchorage on a sandy bottom, at the head of which the largest town in the country with a population in the trading season exceeding 30,000, has grown up ; it has two piers, one of them accessible to small craft at all states of the tide. At Bulhar, between Berbera and Zeyla, and at Hais, farther east, are only open roadsteads, where landing in surf boats is often necessary ; native vessels use a number of still smaller and less convenient ports of call.

The last of the old military system of inland telegraphs ^{External} was abandoned in 1912 ; wireless installations maintain ^{trade.} telegraphic communication with the rest of the world through Aden, which, with Jibuti, is the nearest submarine cable station, and also between Berbera and Bulhar.

The bulk of the trade which these very moderate

facilities have to support is inconsiderable, so inconsiderable that the significance of annual, or even average values is much diminished by the high proportion of any actual increase or decrease that is due to the accident of military or other temporary government requirements. The usual imports are mainly of grain (rice and jowari), and a little tea from India, of cotton piece goods from India, Europe, and North America, and of dates from Basra ; and the total value is about £250,000 yearly. Produce of the country worth rather over four-fifths of the average imports is usually exported ; the chief items are sheep, goats, some cattle and ponies, and hides ; ostrich feathers, *ghi* (clarified butter), *hig* fibre, civet, myrrh, frankincense, and gums, with guano from Meit Island and mother-of-pearl from near Zeyla may also be mentioned. Almost all goes to Aden, the live-stock for consumption, and other articles for transshipment—sheepskins and goatskins, for example, to the United States via London. A great deal of the trade in the seaports passes through the hands of Indians, Arabs, and Jews.

Popula-
tion.

The population appears to be stationary at about 350,000 : the natural hardships of life in a semi-desert are against increase, and the impetus given by somewhat increased trade since the ports at all events have been under civilized control is perhaps more than compensated by the additional deadliness imparted to tribal warfare by the introduction of modern firearms, an illicit trade in which persists along the coast. Since 1911 there has been a census in the ports, but everywhere else estimates only can be made of the number of the inhabitants. Except for seaports there are no towns, hardly any permanent villages, and no regular buildings ; and society is wholly tribal. In 1911 the population of Berbera, as has been stated, was over 30,000 ; that of Zeyla and Bulhar, about 7,000 each ; all have very much less out of the trading season, when different caravans come down from the interior.

Ethno-
logy.

Virtually the whole of the people are of a single race, that called, by a title of rather uncertain derivation,

Somali. Their relationship with their neighbours the Galas, whom they have driven away to the south-east, but whose ruined buildings and abandoned tillage, in many parts of the country, bear witness to a somewhat higher stage of civilization, also remains obscure. Some of the ruins may perhaps be really the creations of Arab proselytizers and traders who have since withdrawn to the coast. The Somali appear to be of mixed Hamitic and Semitic origin, or rather to be Hamites Semitized partially in blood, as physiognomy often suggests, but to a much greater degree socially, by perhaps repeated influx from southern Arabia.

They are described by those who have known them best as intelligent, brave, and cheerful, lovers of freedom and of their home—despite the fact that they have ever been roamers far beyond their own boundaries—but excitable, vain, and above all avaricious; in physique rather lithe and active than muscular, as is natural with the nomad life and spare living imposed by the physical conditions of the land. The same influence of environment can be seen in their personal independence, e.g. in the very limited obedience paid to tribal chiefs, when these are not men of outstanding character and ability; in the desert it is only the fittest who prevail. Of foreign influences the most profound has been that of the Arab, whose nature and history is sufficiently similar to permit of the Somali absorbing a great deal from him, his religion not least of all. Like their neighbours the Arabs, and the Egyptians, all the pure-blooded Somalis are Mussulmans belonging to the Shaf'i sect of the Sunnis. The strictest observance of religious tradition is found near the coast; inland, itinerant mullahs dependent on charity, or others who live in small colonies or *tarikas*, the only permanent settlements in the interior, around which usually some millet (jowari) is cultivated, maintain an irregular national allegiance to Moslem principles.

The full-blood Somalis are divided into two main stocks, called Darod and Ishak after Arab eponyms from whom they are traditionally descended, and now occupying the

social conditions,
and culture.

Divisions
of the
Somalis.

east and the west of the country respectively. The primary sub-divisions are as follows :

<i>Group.</i>	<i>Tribe.</i>	<i>Range.</i>
Eastern	Warsangli	Darror valley and vicinity.
	Dolbahanta	Nogal valley and vicinity.
Western	Habr Gerhajis	West of Warsangli and Dolbahanta.
	Habr Toljaala	Between Habr Gerhajis and Habr Awal.
	Habr Awal	Behind Berbera and Bulhar.
	Gadabursi	Between Habr Awal and Esa.
	Esa	Extreme west behind Zeyla (in greater numbers in French Somaliland).

Of these the Esa alone do not boast Arab blood, and should not perhaps be regarded as belonging to the self-styled 'noble' or 'gentle' (*Aji*) Somali of the full blood. There are also three interesting dependent or outcast peoples (called *Sab*), the Midgans, Yebirs, and Tomals; many of the first two are still pagan, and possibly represent an earlier population, while the Tomals, or Gomals, are of mixed Midgan and Somali blood.

The Midgans are hunters, keeping dogs and using poisoned arrows, and also workers in leather; the Tomals, smiths who make axes, knives, spears, swords, and so forth, nowadays out of imported iron and brass-wire; and the Yebirs, mere gipsy beggars with a reputation for wizardry that enables them to impose on the superstitious Somali. All three, having a less self-sufficient way of life than the nomad herdsmen who are their masters, are scattered among the latter, often as family dependents, instead of having a separate tribal life of their own. Domestic slavery has never been a Somali institution, at any rate not in the territory now nominally British.

Habita-
tions.

Somali society is still patriarchally organized, and the various tribes, each tracing its descent to a common ancestor, tend to be continually and elaborately subdivided on a family basis. When not temporarily and partially concentrated in the coast towns after caravan journeys, the Somalis live in small vagrant communities, each known as a *rer* or *karia*, which rarely stays at one place more than a few days together, moving repeatedly to wherever it can find new grazing, not eaten off, and not customarily or forcibly appropriated by other tribesmen.

By their camp they build a zariba of thorn bushes—when they cannot find and re-occupy some old one—to protect the live-stock from wild beasts, living themselves in *gurgis*, or portable dome-shaped huts ingeniously made something like gipsy tents of a framework of flexible sticks, planted in the ground all round and bent over to form a series of interlacing arches, and covered with bark mats and sometimes hides over all. These materials can easily be carried from place to place on the camels' packs, and the huts built with them withstand the strongest winds.

During the last generation or so the *tobe* or *maro* of imported cotton cloth, worn much like a Roman toga, has become the universal wear, superseding the girdle of tanned skins that was once often the principal garment. The staple and at times the sole food is provided by the milch camels, goats, or sheep; even the herdsmen's riding ponies are given camels' milk with their water. Camel and other meat is occasionally eaten, and, in droughty seasons especially, the diet is supplemented with grain obtained by barter.

Riches have for ages meant to the Somali simply flocks and herds, and he commonly invests all his gains, however earned, in this form of property, the most convenient for his wandering life. The tending of the stock, and especially of the camels, which are almost the only animals to which the Somali shows kindness, is practically the only work that the men will deign to do; thus they will build the zariba, but the women have to set up the *gurgis* and do most of the manual labour. Grazing camels are usually attended by the young men, often at some distance from the *rer*, other livestock by old women and young children; the older girls help with the flocks when on the move, but at other times they and the younger women spend much of their time making mats and *hans*—vessels of plaited grass in which sour milk is carried. It has been estimated that there are between 2,000,000 and 3,000,000 camels in British Somaliland, and perhaps 4,000,000 sheep; the latter carry little wool and are usually white, with black heads and necks, and as a rule hornless. Cattle, of

Clothing.
food.

Occupations.

a small, short-horned, hump-backed variety, are rare except about the Golis range, around Hargeisa, and in the Nogal valley.

Government.

Tribal government is loosely organized, as stated above, but the *akhils*, or wealthiest and most powerful elders or heads of families more or less lead the *shir* or tribal assembly. Chiefs, often called sultans and usually chosen from a particular family but not strictly hereditary, have a limited authority over the larger tribal units which is really measured by the power of their own particular clan. In a country where, during the dry season at any rate, there is rarely water or grazing enough for large herds in any one place, a scattered sectional life of necessity prevails, and it is almost impossible for lasting combinations for mutual support to come into existence. Blood feuds, for the most part arising out of quarrels over the watering-places, or out of camel-stealing, lead to a constant state of clan war, but not to the establishment of centralized governments. Even that exceptional man Muhammad bin Abdullah Hassan, commonly known as the Mad Mullah, in spite of the fanatical religious feeling which he has aroused, has been able to maintain permanent authority over hardly any of the tribesmen except Dolbahanta, among whom he has lived longest, and from whom he is maternally descended. It seems as if any unifying political influence, adequate to suppress tribal turbulence, disorder, and bloodshed, must be imposed from without.

Since 1910, such control has been exercised by a British Commissioner or Acting Commissioner with head-quarters at Berbera, responsible (since 1905) to the Colonial Office, only over a narrow coastal strip ; and the protectorate over the tribes within boundaries agreed upon in British treaties with France, Italy, and Abyssinia (1888-1897), has been merely nominal. Since the abandonment of military operations against the Mullah after 1904, an approximate balance between normal revenue and expenditure obtains, and grants-in-aid from the imperial government have not always been necessary ; about four-fifths of the receipts are from the customs levied on



PLATE XVII (*a, b*). VIEWS FROM SHEIKH, SOMALILAND
(Visual Instruction Committee)



PLATE XVIII (a). THE NILE AT EL KAB, ANGLO-EGYPTIAN SUDAN



PLATE XVIII (b). KAREIMA, ANGLO-EGYPTIAN SUDAN

(Photos Mr. M. S. Thompson)

imports and exports at the three ports of Berbera, Bulhar, and Zeyla, where British district officers continue to be stationed.

(1) H. G. C. Swayne: *Seventeen Trips through Somaliland*. Rowland Bibb-Ward & Co., 1895 (third edition, 1903). Embodies the results of the first graphy. attempt at a complete investigation of the country, and especially of its fauna. Well illustrated. (2) [Lieut.-Col. M. L. Hornby, and others. Official], *Military Report on Somaliland*, 1907, vol. i. Geographical, descriptive, and historical. Wyman, 1907. A most useful compendium of information of all kinds, with some instructive reproductions from photographs, and three maps (Nos. 13 and 14, below, and a geological sketch map). Index inside cover does not show the present sheet lines and numbers of the 1:250,000 map (see no. 15, below) correctly. (3) *Official History of the Operations in Somaliland*, 1901-4, vol. i. Wyman, 1907. Chapter I contains in conveniently abbreviated form the descriptive matter in No. 2, above, two of the same maps (but not the geological one), and most of the photographic views. (4) R. E. Drake-Brockman: *British Somaliland*. Hurst & Blackett, 1912. A book with many good illustrations, by a naturalist and medical officer in the Protectorate. (5) *Colonial Office Reports. Somaliland*. Wyman: annual. These reports from the Commissioner's office at Berbera give the latest official statistics and other information. Some back issues are still of interest, e.g., those for 1905-6, 1906-7, 1909-10. (6) J. W. Gregory (in *Geological Magazine*, 1896): *The Geology of Somaliland*. A short summary of knowledge to date. (7) F. B. Parkinson, Lieut. Brander-Dunbar, and G. P. V. Aylmer (in *Geographical Journal*, January, 1898). Two interesting short accounts of journeys made partly with scientific objects. (8) R. Koettlitz, (a) (in *Scottish Geographical Magazine*, August, 1896): *A Journey through Somaliland, &c.*; (b) (in *Geographical Journal*, March, 1900), *Notes on Geology, &c.* Supplements No. 6, above, and gives other observations of a scientific traveller.

See Nos. 2 and 3, above. (9-11) Admiralty Charts, Nos. 6b, Gulf of Aden Maps. (Western portion), about 10 miles to 1 inch: 3530 Berbera harbour, about 7 inches to 1 mile: 919 Zeila, Hais, and Bulhar anchorages (also Obokh), on various scales. From surveys of various dates, but constantly revised. (12-15) Topographic maps, all compiled at the War Office. I.D.W.O., No. 1539; old series 1:1,000,000 map of Africa, sheets 68 and 69, 1901. These two together cover the whole country; this map is really only a more finely drawn but unrevised form of T.S.G.S., No. 1781 (see below), which supersedes all except the western end of sheet 68. T.S.G.S., No. 1781; map of a portion of Somaliland, 1:1,000,000 (with hills shown by brown form lines), 1906. T.S.G.S., No. 1675; sketch map of Somaliland, 1:3,000,000 (relief not shown, but the map includes tribal names and routes), 1907. These two maps accompany the official publications, Nos. 2 and 3, above. The first covers all British Somaliland except the extreme west, beyond Hargeisa: limits, 5° and 11° N. lat., 44° and 50° E. long. The second includes the whole Somali peninsula north of 1° S. lat. and east of 42° E. long. T.S.G.S., No. 1764; single degree sheets on 1:250,000 scale (only published for a part of the country). These are the largest and fullest maps available: similar in style to the 1:1,000,000 maps, with water shown in blue.

CHAPTER XV

THE ANGLO-EGYPTIAN SUDAN AND EGYPT

BY CAPTAIN H. G. LYONS

Natural Conditions

Position
and boun-
daries.

THE Anglo-Egyptian Sudan and Egypt together include the greater part of north-eastern Africa. On the west Barca, Tripoli, and the French Sudan adjoin along a frontier, not as yet accurately demarcated, which traverses the Libyan desert from the Gulf of Sollum on the shore of the Mediterranean to the Nile-Congo divide to the east of Lake Chad. To the south this river divide is still the boundary along the ridge of hilly country which separates the Bahr-el-Ghazal province of the Sudan from the Congo State until the Nile is reached, beyond which Uganda and the Sudan are conterminous along the fifth parallel of North latitude. East of the Nile the Italian colony of Eritrea and Abyssinia adjoin the Sudan and contain a considerable portion of the Nile basin, including the head-waters of all the rivers which are most influential in determining the annual flood upon which the prosperity and fertility of Egypt wholly depends.

Though long known and frequently traversed by travellers, traders, and others, detailed investigation of this interesting region has not been widely undertaken, so that in treating of many parts we must often depend largely on isolated observations and inadequate information.

Connex-
ions with
adjacent
lands.

Situated in the north-eastern part of the African continent, this important region is linked on the one hand to the equatorial zone of Africa, and on the other to the Mediterranean basin, and includes a part of one of the largest desert regions on the globe. The Anglo-Egyptian Sudan begins at the northern boundary of Uganda in 5° N. lat., and extends northwards over the vast plains of Kordofan, Gezira, and the Blue Nile, past the foot of

the Abyssinian table-land on the east into the arid and rainless regions of Nubia. Here no physical boundary divides it from Egypt, but on the contrary, the Nile, whose valley supplies the only tract for sedentary settlement, forms a line of communication connecting the plains of the Sudan with the fertile valley of Egypt, and opens at its delta into the busy inland sea of Europe, within easy reach of the ports of that continent. It is the small area which is available for settlement in Egypt, and the very moderate population which the Sudan plains can support at present, which restrict the importance of these regions and militate against the advantages of their world-position.

This large tract of north-eastern Africa which constitutes Egypt and the Egyptian Sudan presents no very great variety of type in its physical character. Gently sloping plains predominate, above which here and there rise isolated hill-masses which stand out on account of their greater power of resistance to erosion. On the eastern boundary along the western shore of the Red Sea a hill region contains numerous peaks of considerable altitude, but elsewhere differences of relief are small; the general slope is slight, and we may ascend the Nile for 3,000 miles before we reach an altitude of 1,500 feet above sea-level. In the south, on the northern confines of Uganda, where the foothills of the equatorial plateau give place to the plains of the southern Sudan, there is a vast extent of level country in which even a small hill is a rare object; and to the westward, from the Nile-Congo watershed to the Bahr-el-Ghazal, the country falls gradually with a gentle slope.

Physical
character-
istics :
general
rate of.

These plains, formed of the material which has been derived from neighbouring high ground by erosive agencies acting during a long period, and which is still being added to by that which is brought down from the equatorial plateau and the low ridge which forms the Nile-Congo watershed, are drained by streams which occupy shallow drainage lines lying but little below the general level of the plains, and often end in marshy depressions, without reaching the main river. East and west of the

Plains of
the south.

White Nile the same gently sloping plains are the dominant feature, their ill-defined drainage systems flowing from the Abyssinian foothills on the east, and from the maturely eroded hill-mass of Central Kordofan on the west, usually without reaching the Nile.

The
north.

To the north of Khartoum the same general character prevails, though the desert to the eastward becomes more strongly dissected by erosion as the higher ground of the Red Sea hills is approached, and here heavily aggraded slopes of detritus with highly eroded hill-masses rising from it are characteristic of the desert of the eastern Sudan.

Nubia.

In Nubia, both east and west of the Nile, the desert is largely formed of sandstone, which is but feebly resistant and weathers to gently undulating plains on which here and there low tabular hills of more resistant character may be seen, but scenery of more strongly marked character occurs in the eastern portion where the harder crystalline rocks rise above the plain, and their erosion has given rise to steep-sided bare hills and narrow gorges, wholly different in character to the desert features of the country on the west.¹

Egypt.

This sandstone plateau continues northward into Egypt, where it gives place to a white limestone, which from its greater hardness often stands out as a well-defined escarpment overlooking the lower-lying plains to the southward and the oases which lie in its re-entrant bays. This limestone plateau presents an extraordinarily even surface to the west of the Nile, and even to the east of this river vast level plains occur, though here and there the drainage has carved out broad wadis leading from their eastern margin to the Nile Valley.

Eastern
hill
country

In strong contrast to these monotonous plains is the narrow belt of hilly country which borders the Red Sea and the Gulf of Suez, for here instead of soft sedimentary rocks we have hard, resistant, crystalline rocks, granites, gneisses, schists, and lavas of every ancient date. These have been affected by the folding which has raised them

¹ J. Ball, *Topography and Geology of the Red Sea Hills*. Cairo, 1913.

above the level of the plains, and the fracturing which has occurred along this narrow ocean arm, so that both at the present time and still more at an earlier period when rainfall was probably somewhat more abundant, erosive action has deeply scored the region, producing a youthful type of country highly dissected by innumerable valleys and ravines, while a wide range of temperature has rapidly weathered the hill-tops.

As a result of this, vast quantities of detritus have accumulated in the valleys, and steep hill-sides of bare rock, rising almost sheer for hundreds of feet from the level valley-floors, are characteristic of this hill region. This belt of high ground has naturally given rise to a series of well-marked drainage systems, which now as dry valleys intersect the plains to the east of the Nile, and in places have cut their channels to a considerable depth below the general level.

Although these valleys rarely carry any water except for a few hours after the rain-storms which burst on rare occasions in the desert, the Nile, fed by the rains of the equatorial and Abyssinian plateaus, is able to maintain its course from south to north throughout the year, and so forms an important feature in an almost rainless region. In the southern Sudan its trough is but little below the general level of the country, but farther north in Nubia it flows in a narrow valley, usually less than a mile wide, which it has formed in the sandstone plains; in Egypt it attains its greatest importance, for here the valley reaches a width of 10 miles, and the alluvial plains formed from the detritus of the basalt of Abyssinia provide a tract of the highest fertility, on which, by the waters of the river, a dense population can dwell in a rainless region.

Thus it will be seen that a large part of the region is occupied by rocks of comparatively feeble powers of resistance to erosion, and this is clearly shown in the forms which the relief of the country assumes. Some areas, however, such as the Red Sea Hills, are highly resistant, since they consist of rocks which were originally volcanic ashes and lavas, but which are now highly altered, and

The Nile :
general
character
of valley.

Rocks :
erosion
and relief.

with these are associated sedimentary deposits which have been changed into schists and slates. Into these rocks have been intruded masses of molten granite and other igneous rocks, producing much alteration in them. Crystalline rocks of apparently similar character occur at many other parts of the Sudan, and granite, gneiss, and other related rocks form the foothills of the equatorial plateau and the Nile-Congo watershed, but they have been for the most part covered by the alluvial deposits which form the surface of the country for long distances, and only emerge rarely as isolated rounded hills. These highly resistant ancient rocks occur again in the Gezira, between the Blue and White Nile, and widely in the Kordofan province, where they form the low hill-groups which are but the worn-down stumps of a once much more important feature. From Khartoum northwards until Upper Egypt is reached in about 25° N. lat., a widely developed sandstone deposit covers the highly eroded and uneven surface of the crystalline rocks, and being horizontally bedded weathers easily into low flat-topped hills of characteristic form. To the eastward, from beneath the sandstone, rise the strongly dissected hill ranges which border the Red Sea, and this same series of rocks is largely represented in southern Sinai.

The sedimentary rocks of Egypt dip gently to the northward at a steeper angle than the general fall of the country, so that successively younger strata appear towards the north. The sandstone is succeeded by a series of thick limestone deposits, which from their greater resistance often form a steep-faced escarpment overlooking the sandstone plain below, while clay beds at its base, overlain by the limestone, often give rise to a confused mass of foothills along the boundary between the two. In the extreme north of Egypt friable, non-resistant sands and limestone of comparatively recent age form a country of low relief, in which conspicuous land-forms are rare.

Effects of
erosion.

Such are the materials which are exposed to the erosive agencies of these regions, and from which the present relief of the land has been formed. On the whole, they

offer but a moderate resistance to their attack, and the weaker deposits, such as the wide alluvial plains of the Sudan, are strongly dissected along the drainage-lines by the monsoon rains of the summer months wherever the slope of the ground is favourable.

The agencies which are at work on the surface of the land include both the heavy rains of the tropics and the wide and rapid variations of temperature, together with wind action, which are characteristic of the arid regions in and near the tropics.

Since the rainfall is heavy and lasts for five or six months in the south of the Sudan, wherever the surface slope is sufficiently steep erosion of the river-beds and drainage-channels proceeds rapidly, and large quantities of detritus are carried down to the lower plains. Consequently in the foothills to the east of Mongalla and Gondokoro, and along the northern watershed of the Nile-Congo divide the country is of a maturely dissected type in which numerous streams have cut deeply into the surface ; but this slope rapidly decreases, and in their lower reaches deposition takes the place of erosion, the streams deposit their load of silt, and their waters in the rainy season flood the country far and wide, while in the dry season they end in wide marshes where a dense vegetation checks any erosive action. In the same way the Sobat River and its tributaries as they descend from the Abyssinian plateau in flood, bring down vast masses of silt which is eventually deposited in the lower reaches of the river and in the White Nile beyond. As the more northern regions are reached, the rainfall rapidly diminishes, and although an occasional 'seil', or sudden rush of water down a valley channel which is usually dry, may have a powerful erosive effect, yet such occasional occurrences are very local in their action, and their influence is restricted to the valley in which they occur.

Climate

During the last twelve years a network of meteorological stations has been established throughout Egypt and the

General
considera-
tions.

Sudan, and a large amount of reliable material has been accumulated which enables us to give a fairly complete and accurate account of the climatic conditions which prevail. Since the whole of north-eastern Africa lies within or near the tropics, the climatic conditions are comparatively well defined. Essentially continental in its position, situated in the high-pressure region of North Africa, and swept by dry northerly winds, heat and dryness are the principal characteristics of the Egyptian and Sudan climates, but these vary considerably in different parts. It has been found convenient, therefore, to distinguish seven districts which possess well-defined types of climate.¹

Climatic districts :
East
Mediterranean. The first of these, the East Mediterranean, contains Cyprus, the coast of Syria, and the north coast of Egypt, which is thus linked up with the Mediterranean basin. It is characterized by a mild winter in which rain falls frequently, as cyclonic depressions pass along the Mediterranean from west to east, but the summer is hot and dry.

Egyptian district. The second district, the Egyptian, extends from the northern part of the delta to about 28° N. lat. Situated farther from the waters of the Mediterranean, its winters are colder, and its yearly rainfall diminishes rapidly, from the 8 inches which are recorded at Alexandria and on the coast to 1 inch at Cairo, beyond which it is practically nil, since it is only furnished by occasional storms. Here the climate is hot and dry, with a temperate winter season extending over about four months.

Saharan region. The Saharan region lies to the south of the Egyptian and reaches to the 20th parallel of latitude, in the neighbourhood of the Third Cataract. This hot and arid region is neither reached by the rain-bearing currents of the monsoon nor by those of the Mediterranean depressions, so that northerly winds prevail throughout the year with clear skies and hot dry weather. Local depressions occasionally cause sand-storms, but only very rarely is any rain recorded, though a heavy local fall may occur at long intervals. The high temperature and extreme aridity here produce typical desert conditions.

¹ J. I. Craig, Meteorological Report, Cairo, 1907.

As we move still farther southwards we enter the Sudan ^{Sudan} region proper, of which the northern portion, from the Third Cataract to Khartoum, experiences conditions which closely resemble those of the Saharan region, except that the advancing monsoon currents affect the climate in May and June. The temperature then falls slightly and violent thunder-storms and dust-storms occur; some rain falls in July and August when southerly winds prevail, and after this the temperature rises somewhat as the rains recede southwards, only to fall again in October to the winter minimum in January.

These characteristics undergo considerable modification in the central and southern portions of the Sudan, which lie farther south and therefore more completely within the air-currents of the southerly monsoon. Here the summer rains form a much more important factor, so that on the plains of the Central Sudan the nomad tribes are able in most years to raise considerable crops by sowing the more fertile areas at the beginning of the rainy season. The long and hot dry season prevents any considerable extension of cultivation where irrigation cannot be employed to meet the needs of vegetation, and consequently the natural products of the region are mainly gum from the acacia trees, which are able to flourish under these conditions, and the raising of sheep, cattle, and camels, for which there is sufficient coarse fodder to be found.

Normal values of some of the climatic factors for each of these regions will exemplify the general characteristics which have been shortly described. ^{Climatic factors.}

TABLE I

Station.	Lat. N.	Temperature.			Rel. Humid. Per cent.	Rainfall. Inches.
		Max. °F.	Min. °F.	Mean °F.		
Alexandria .	31° 12'	76·6	62·7	68·6	71 0	8·7
Helwan .	29° 52'	81·7	59·0	68·6	53·8	1·0
Wadi Halfa .	21° 55'	93·3	63·0	76·9	33·8	—
Khartoum .	15° 37'	98·9	70·7	83·3	32·3	5·2
El Obeid .	13° 11'	94·2	63·8	77·7	37·5	14·4
Mongalla .	5° 11'	93·4	69·7	79·2	73·7	35·0

Thus it will be seen that the whole region is characterized by high temperatures, and since in the arid climate the sky is seldom clouded, the ground is heated rapidly to a high temperature. For the same reason radiation is rapid at night and consequently the range of temperature is great. At Wadi Halfa, where a shade temperature of 126.5°F. has been registered, the mean (non-periodic) range is 30.2°F. , and the difference between the highest and lowest temperatures hitherto recorded is

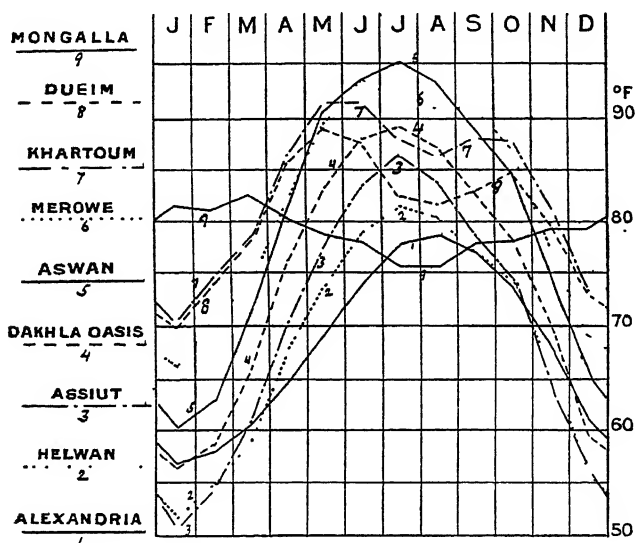


FIG. 16. Monthly temperatures at various stations.

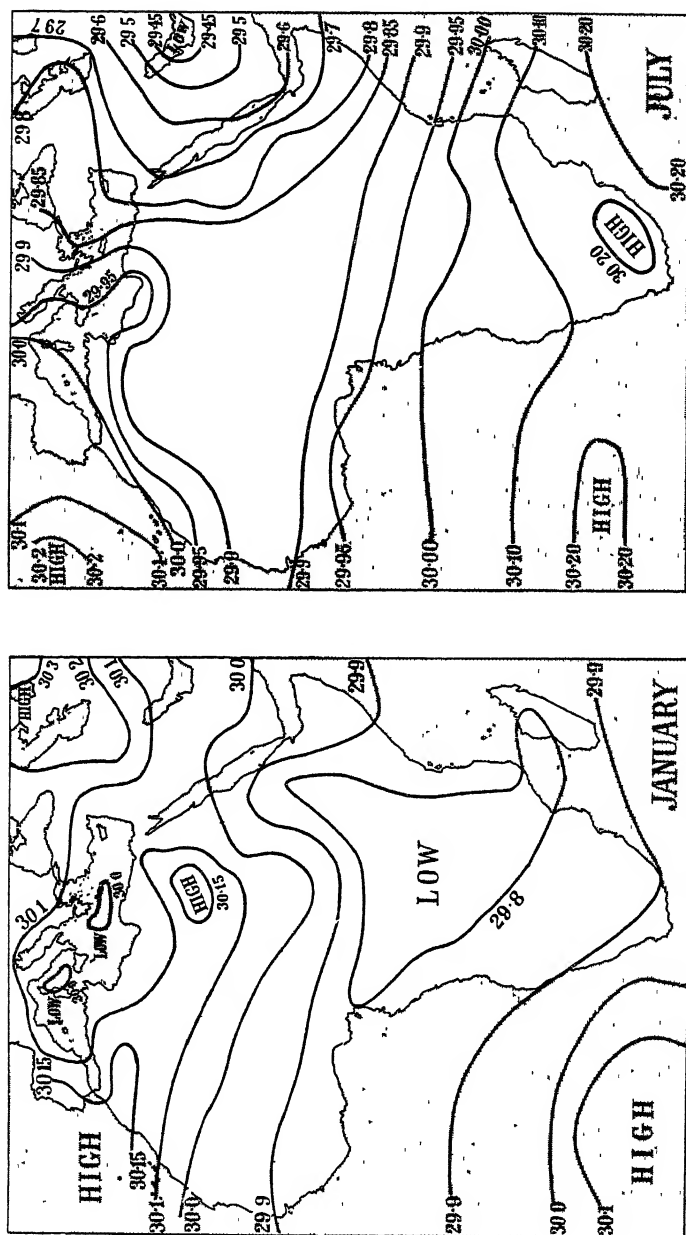
92.7° . In contrast with this, at Mongalla in the south, situated not far from the foothills of the equatorial plateau, the variation of temperature throughout the year is small, and on account of the rain coinciding with the summer months, the lowest temperatures occur in July and August, while the highest are recorded in the early months of the year when the north-east trade-winds blow down to this latitude (5°N.), and clear skies prevail.

The arid and continental character rapidly increases, however, as we go northwards, and by the time that

Dueim (14° N. lat.) is reached it is well developed, but both here, at Khartoum ($15^{\circ} 37'$ N. lat.), and even at Merowe ($18^{\circ} 29'$ N. lat.) the drop of the temperature curve in June, July, and August, coincident with the monsoon rains, is strongly marked (see Fig. 16). Beyond this their effect is not felt and the maximum temperature of the year falls in July, or on the coast of the Mediterranean Sea in August. The effect of this inland sea is well shown by the mean temperature of Alexandria in January, which is not only higher than that of Cairo at this season, but also than at both Assiut and the Dakhla Oasis in the Libyan desert to the west of the Nile, which lie 4° and 6° respectively to the southward. The same result is seen in the way in which the minimum temperature in the Nile valley retreats southwards as the winter season advances: in September and October it is near Cairo; in October it is near Assiut; in November, December, and January it lies south of Assiut, afterwards returning northwards as the temperature of the year rises. The seasonal variation in different parts of the region is well indicated in Table I and in Fig. 16, where the continental character of the northern stations and the monsoon influence on the southern stations are clearly seen.

Though not in itself of climatic importance, the distribution of atmospheric pressure in north-eastern Africa has a powerful influence on the winds and rainfall of the region. The establishment of numerous climatological stations along the course of the Nile during the past decade, and the determination of the altitude of each by means of spirit-levelling, has given a precision to our knowledge of the conditions prevailing in this part which we have not hitherto possessed, and which does not yet exist at many places in the continent of Africa which are situated away from the sea-coast. Utilizing these data we are able to draw lines of equal pressure with a fair accuracy for the neighbourhood of the Nile basin, and to suggest a probable approximation to the truth for the more doubtful region lying farther to the west.

Winds and
pressure.



The principal change which this fuller information has introduced into the barometric charts of northern Africa is to limit the region of low pressure which extends westward from north-western India in the summer months, and to terminate it near the line of the Nile valley ; to the west of this throughout the Sahara there appears to be no very appreciable gradient, and while the isobar of 29·85 inches lies near to the meridian 28° E., that of 29·90 inches probably runs from the province of Barca on the Mediterranean shore in the north to the coast of Senegal on the west, and the southern isobar of the same pressure may run from near Mombasa on the Indian Ocean to the northern portion of Sierra Leone on the shore of the Atlantic. Between them lies a vast region in which at this time of year the north-east trade-winds, and the south-west monsoon currents meet, and into which the monsoon rains extend from the south to about the eighteenth parallel of north latitude. At this time of year, then, when the summer conditions of the northern hemisphere prevail, the climate of northern Africa between the third and eighteenth parallels of north latitude is largely dominated by the northerly position of the equatorial belt of low pressure, which causes southerly and south-westerly winds to pass northward of the Equator ; the great depression which lies over north-west India and Baluchistan during the monsoon increases the westerly direction of the winds in the neighbourhood of Suakin and the southern portion of the Red Sea. The Mediterranean Sea is not now a factor of such importance as it is in winter ; the isobars traverse it more or less meridionally, and those indicating pressures less than 29·90 inches continue their course along the Nile valley until they bend eastward about the tenth parallel, while those of the higher pressures skirt the north coast of Africa in a westerly and south-westerly direction, passing round the great high-pressure region in the neighbourhood of the Azores, thus leaving a vast area from Lake Chad northwards in which the winds are light and the differences of pressure appear to be ill defined (Fig. 17).

Regional
and
seasonal
distribu-
tion of
pressure.

This arrangement of pressure is usually established early in June, and becomes fully developed in July and August, when the monsoon rains are at their height. In September the influence of the Indian low pressure diminishes, and by October the winter distribution is well indicated and continues with little change in its general character from November to April.

The principal low-pressure area of Africa now occupies the central portion of the continent, mainly to the south of the Equator, but a well-marked loop of low pressure extends northward from Uganda towards Abyssinia and Eritrea as far as 15° N. lat. Another low-pressure area occupies the warm waters of the Mediterranean and forms a zone along which a series of depressions sweep along from west to east, bringing winter rains to the shores of North Africa and Syria, and cold winds and cloudy skies to a wider region inland. A high-pressure ridge extends at this season from south-western Siberia across northern Arabia, into the Libyan desert in the latitude of Cairo, and thence through the northern Sahara to the southern region of Algeria and Morocco. As the result of this distribution, northerly winds prevail over the whole of northern Africa, becoming more north-easterly in the western Sahara; clear skies are the rule, and the anti-cyclonic conditions which exist over all Africa north of the Equator at this season furnish the steady breezes, warm days, and cool nights which are characteristic of the whole of northern Africa, once the Mediterranean coast-belt with its rains has been left to the northward (Fig. 17).

With the gradual change to summer conditions, the northerly winds weaken between the Equator and 10° N. lat.; the low-pressure area moves farther north and gradually joins across Arabia with that which is forming over north-western India. As the southerly and south-westerly winds extend farther northwards, the rains follow, sweeping across the plains of the southern Sudan and attaining their maximum on the table-land of Abyssinia in July and August. North of the twentieth parallel of latitude the north-easterly trade-winds still prevail, and

thus maintain the arid character of the northern Sudan and Egypt.

As far south as 20° N. lat. the annual range of barometric pressure is considerable, amounting to about 0.4 inches, but from Khartoum southwards, within the region of the monsoon rains, it is small. In the trade-wind region the minimum falls in July and the maximum in January, but to the south of this a small secondary maximum appears in the summer months and coincides generally with the middle of the rainy season. Range of pressure.

In the western and central part of North Africa there are very few inland stations of which the altitudes are known with sufficient accuracy to reduce the observations to a common datum, but by comparing the departures of the monthly mean values from the mean of the year, Dr. J. Hann¹ has indicated that shallow troughs of low pressure seem to be formed across Africa from west to east, and to sweep northwards as the sun's north declination increases.

The 'Khamsin' winds of Egypt are hot dry winds blowing from the south quadrants, being most common in the spring months, and while they prevail the air is often thick with the drifting dust and sand. These hot southerly winds are often described in exaggerated terms, and though they cause considerable discomfort, they cannot be said to be dangerous as a rule. The controlling factor of these 'Khamsin' winds is a depression moving along the Mediterranean not far from the Egyptian coast, combined with a high-pressure area lying over Upper Egypt, and usually to the east of the Nile. Under these conditions a hot dry wind blows, strongly at first from the south-east, veering gradually to the south-west and west; then as the low-pressure area passes away to the eastward the wind shifts rapidly into the north, blowing with much diminished force, and being associated with cooler weather. The first indications of these winds are a falling barometer as the depression approaches from the west, a rapid decrease of humidity at night as dry Khamsin winds.

¹ *Meteor. Zeitschr.*, February 1910.

air begins to arrive from the south, and the appearance of high, light, cirrus clouds moving in advance of the depression. As these conditions develop the wind increases in force, the air is filled with dust and sand, which raise its temperature and at times render objects invisible at a short distance. They last usually from two to three days and produce abnormally high temperatures both by day and night when they occur in the early summer.

Habub. Violent sandstorms of a cyclonic character (known as 'habub'), which blow with great violence for a few hours, occur in southern Egypt and the northern Sudan, but are strictly local in their effect.

Rainfall.¹ Closely connected with the seasonal oscillation of pressure is the rainfall of north-eastern Africa, and on its distribution depends the regimen of the numerous rivers which stream down from the high land of Abyssinia and British East Africa. The steep gradient of rainfall in this part of the world is a very marked feature, for as much as 40 inches fall annually on the ninth parallel of latitude in the Nile basin and only 5 inches at Khartoum, some 400 miles to the north.

Heavy rainfall of Central Africa. In January, Nyasaland is receiving its heaviest rainfall, which continues throughout February, after which it gradually decreases and the dry season sets in there in May. The belt of heavy rainfall is now moving northwards over German East Africa, where the maximum occurs in April and May, and in these months also Uganda and British East Africa receive their greatest amounts of rain, so that at this season the equatorial plateau enjoys its principal wet season. As a result of this the level of Lake Victoria rises gradually from February until about the end of May, when the highest level of the year is usually attained, and then falls slowly during the following dry season of July to October. The variation of the mean level of large inland lakes during a period of years

¹ Full details of the rainfall of this region will be found in Reports on the Rains and Flood of the Nile Basin, 1904 and subsequent years, Survey Department, Cairo, 1905-12.

is sometimes taken as an indication of recurring periods of greater or less rainfall, and to some extent this is no doubt true, but care must be exercised in selecting the material from which any deduction is to be made.

After leaving Uganda and entering the southern Sudan, we reach the region where a single rainy season lasts from May to October in the south, and from June to September in the north, the remainder of the year being rainless. Here the monsoon of north-east Africa is typically developed. The winds which blow steadily from the north and north-east all the winter and spring are replaced by southerly and south-westerly winds in April and May, when the first light rains fall in the southern Sudan and on the southern portion of the Abyssinian table-land. As the low-pressure area extends northward the winds become more steadily south in their direction, and the rains increase. The general relief of the country and the distribution of pressure does not cause so great a development of the monsoon conditions as occurs in southern Asia, but the winds are usually moderate, and the rainfall is nowhere excessive, the greatest amount falling in August on the Abyssinian table-land being about 14 inches ; but this Abyssinian rainfall is of the greatest importance since it supplies the Blue Nile and the Atbara, which furnish the annual flood to Egypt. At Khartoum the rainfall has dwindled to a total of 6 inches, which falls almost wholly in July and August ; and to the northward only occasional storms occur, but even these rarely extend farther north than Merowe ($18^{\circ} 29' \text{ N. lat.}$), and from this point to near Cairo the climate is practically rainless. Every year or two a shower may fall even here, but though these occasional rain-storms are sometimes heavy, such occurrences are quite local and the rain they bring is of no use for agricultural purposes, though they serve to keep up the scanty supply of water in the wells and rock-pools to which the nomad Arabs of the desert and their flocks resort. Scanty rain also falls in winter on the Red Sea coast and the hills which border it, whereby a meagre vegetation is able to flourish in the valleys and ravines,

Decrease
of precipi-
tation
north-
ward.

enabling the Arab tribes to breed and raise large numbers of camels in these valleys where there is sufficient forage for their subsistence.

Mediterranean rainfall.

The Mediterranean rainfall, which also occurs in the winter months, amounts to 9 inches at Alexandria, 10 to 11 inches on the coast farther to the westward, and 3 to 4 inches at Port Said. In the Nile delta it is of no great

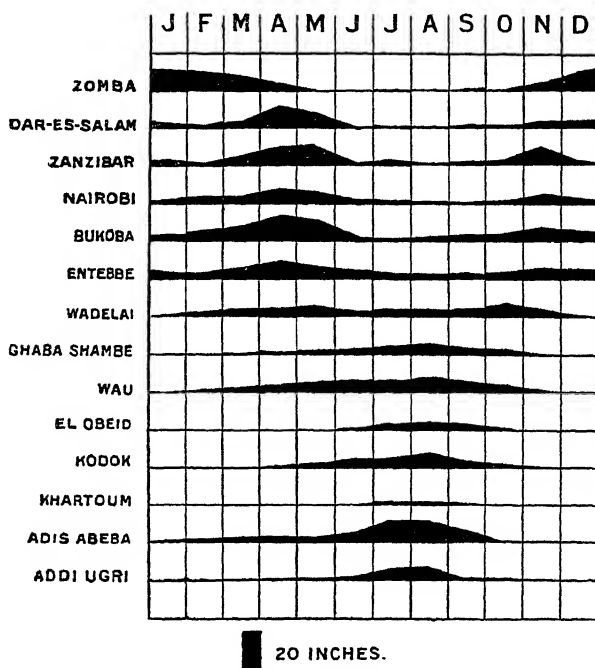


FIG. 18. Monthly rainfall at various stations.

importance to the agriculturist, except that it serves to maintain the moisture of the soil while the cleaning of the canals is taking place, but nowhere in the delta and valley of Egypt is the rainfall a factor of any real importance for agriculture. West of Alexandria near the sea-coast considerable crops of barley are obtained, which depend on this winter rainfall for the necessary moisture, for they are beyond reach of any assistance from irrigation, for the present inhabitants have made no attempt to develop the local resources of the country, which has

remained a semi-desert since the decay of the ancient Roman province of Cyrenaica, in which, before the Arab invasion, cultivation was extensively developed with the aid of reservoirs, valley dams, rock cisterns, and other artificial assistance by which the utmost use might be made of the very moderate supply of rain.

In the region where rain rarely falls the humidity is Humidity. naturally extremely low, and though the amount of water vapour present may be considerable, the air usually contains but a small portion of that which it could take up at its temperature. In the spring months, when hot southerly winds are not uncommon, very large and rapid oscillations of humidity take place. In March 1901 the mean humidity at Abbassia near Cairo on the 21st was 16 per cent., and on the 22nd of the month 58 per cent. On the 20th at 4 p.m. the air temperature was 95.6° , the wet-bulb thermometer read 61.5° , the vapour tension was 0.05 inches, the relative humidity 2 per cent., and the dew-point 3.2° , at a station on the edge of the cultivation of the delta. The vegetation shows everywhere the effect of the low humidity, for desert plants have small leaves, and their deeply seated root-fibres enable the plant to exist during long periods of drought.

*Hydrography*¹

Twenty-four centuries ago the climate of the Sudan and its relation to the most striking and important phenomenon of the wonderful land of Egypt still constituted one of those problems which the early Greek philosophers speculated upon and strove to solve. The shores of the eastern Mediterranean familiarized them with a rainless summer which greatly diminished the streams and rivers, and dried up vegetation, but one great stream, the Nile, was seen to constitute a notable exception since it began to increase at midsummer and became smaller

The Nile
flood: his-
torical.

¹ See H. G. Lyons, *The Physiography of the Nile and its Basin*, Cairo, 1906; *Geographical Journal*, November 1908, and July 1909; *Das Abflussgebiet des Nils*, Dr. W. Pietsch, Berlin, 1910.

as the winter approached; and this was the more astonishing to them, as it was widely believed in those days that the zone between the tropics was uninhabitable, on account of the intense heat which there prevailed. Basing his deductions on the information brought back by those sent by Alexander to investigate the causes of its flood, Aristotle concluded that the rise of the Nile was due to the rains which fell on the mountains of Ethiopia between July and October, though he erroneously attributed these rains to the northerly (Etesian) winds with which he was familiar.¹ It was not until the Greeks became acquainted with India and its climatic phenomena that the monsoon of the Indian Ocean was known to them; but the conditions which determine it, and explain its high development in India and its less marked occurrence in other regions, were not understood until comparatively recently, when the distribution of atmospheric pressure over the globe and its effects had been worked out. But the principal characteristics of the climate of north-eastern Africa were then recognized by the ancient Greeks, who knew of the hot, rainless region beyond which rains fell yearly with extraordinary regularity, and in sufficient abundance to maintain a great river through its course of 3,000 miles, from its sources in the mountains to the sea, not only in its flood season but throughout the whole year.

Modern
observa-
tions.

This knowledge was slowly added to in later times, but the scarcity of observations and the short periods which they covered prevented any thorough study of the climate of the Sudan; and although the main lines of Nilotic hydrography were well laid down by Lombardini² fifty years ago, it was generally believed until the beginning of this century that exceptionally high floods in the Nile were due to the coincidence of high levels in both the Blue and the White Nile, that is, to heavy rainfall on both the equatorial and Abyssinian plateaus. This seemed to be

¹ J. Partsch, 'Des Aristoteles Buch, "Über das Steigen des Nils,"' *Abh. phil.-hist. Klasse d. Kön. Sachs. Gesell. d. Wissenschaften*, Leipzig, 1909.

² E. Lombardini, *Essai sur l'hydrologie du Nil*, Milan, 1865, and *Mémoires de l'Institut de Milan*, vol. x.

substantiated by the measurements of the two rivers which were made near their junction by Linant de Bellefond, Chélu, and others ; but recent and more accurate determinations have proved the overwhelming importance of the Blue Nile, as recognized by Aristotle, and the comparative insignificance of the White Nile, as a factor in the Nile flood.

In Egypt, from the earliest period of antiquity, the annual flood of the Nile was recognized as the most important phenomenon of the year, and it attracted the attention of the dwellers in the valley both on account of its importance to them and from its occurrence in a region where the climate is practically rainless. According to Herodotus, the ancient Egyptians considered the river as flowing from two springs in the neighbourhood of Philae Island at the head of the first cataract, although this legendary source cannot have coincided with their experience, since from very early times they were acquainted with its Nubian valley and the Sudan plains beyond, and therefore knew that the true sources lay to the south of this again. But these southern regions were poor and inhospitable as compared with the fertile flood plain and delta of Egypt, and beyond raiding them for slaves and cattle and levying a tribute upon the inhabitants, the Egyptians interested themselves but little in the upper reaches of the river.

Although the geographical exploration of the basin of the Upper Nile was actively prosecuted during the second half of the last century, the Mahdist rebellion closed this region to travellers in 1884, and for the next fifteen years but little could be done. In 1899 the capture of Omdurman and the defeat and dispersal of the Dervish forces once more opened the southern Sudan to European activity. In the meantime Egypt, under a stable government and an efficient organization, had increased marvelously in economic prosperity. Improvements in the irrigation system enabled the cultivator to receive regularly the water which he required, and the construction of the Aswan reservoir furnished a supply of water which

Early
know-
ledge of
Upper
Nile.

Later
explora-
tion.

sufficed, with strict economy, to meet the most pressing needs of the country and its rapidly increasing population during the low stage of the river; but more water was necessary if the waste lands which lay along the northern margin of the delta were to be reclaimed and cultivated.

Since the beginning of this century much has been done to complete our knowledge of the hydrography of the Nile and its tributaries, and the main characteristics of the various portions of the river systems which drain the Sudan have been ascertained. Many views formerly held have been modified as new information has been accumulated, and we may now say with some confidence that the regimen of the basin is well known in its broad outlines; although much detailed work remains to be done, and although many lines of investigation are as yet almost untouched, it is possible now to describe the more striking geographical characteristics of the river, and to indicate some of the deficiencies in our knowledge which still remain to be made good by those who have opportunities for observation.

The three
factors in
the Nile
regimen.

There are three principal and characteristic factors of the Nile regimen which exercise a marked effect upon it as a whole, and influence to a greater or less degree each portion of the river system, though each portion also has its own peculiarities, which may greatly alter its reach of the river, and may produce effects which in turn influence other areas.

Firstly, the Plateau of the Equatorial Lakes and the Abyssinian Plateau; both of these receive a heavy rainfall and thus supply the whole of the water which is carried by the Nile and its tributaries, that which falls on the Sudan plains being too little to affect the run-off, so that it may be considered as being practically negligible as a source of supply for the river; secondly, the rainless, or at least arid, conditions which prevail over a very large proportion of the basin, since even over the greater portion of the Sudan plains precipitation is very moderate in amount; thirdly, the very low slope of the basin, which is such that an altitude of 1,500 feet above sea-

level is not gained on the White Nile until a point 3,000 miles from the Mediterranean, near Gondokoro, has been reached. Though each portion of the river has its own peculiar character, these three factors, a heavy localized rainfall, aridity in other parts of the basin, and a valley of low slope, are those which exert the greatest and widest influence.

Within this vast river-basin, containing nearly 1,000,000 square miles, we meet with relations between the different parts which have a very direct effect on the regimen of the river and consequently on the geographical phenomena, both physical and organic, of the basin. The Nile in no way presents an example of a river having a normal profile passing regularly from the steep slope of its mountain track, through its valley track and into the plain track of its lower reaches, but abruptly changes from one to another. If we examine its longitudinal section from Lake Victoria to the Mediterranean, we find abrupt alternations of level reaches and steeply sloping grades, so that four portions of it stand out very clearly as differing greatly from one another. The first is the mountain track exemplified by the equatorial plateau, and the Abyssinian table-land, from which the streams pour down their steep beds in the rainy season, and carry vast quantities of material in suspension to be deposited in lakes or on the alluvial plains of the lower reaches; the second is a valley track, in which erosion is in active progress, and which extends from Khartoum to Aswan, 1,167 miles long, in which the river flows through alternate reaches of low slope where sandstone occurs, and others of rapid current and steep slope where crystalline rocks form the cataracts of the Nile. The third class or plain track is extensively developed, and occupies, as might be expected, the valley of Egypt, where the fertile flood-plains, formed by the detritus brought down by the Blue Nile and Atbara from the Abyssinian plateau, have for centuries supported a dense population. But, besides this, there is another long plain track extending from the foot of the equatorial plateau at Gondokoro to Khartoum,

Physical
character
of the
Nile basin.

a distance of 1,071 miles, in which the slope is very low and the river banks are often lined with a marsh vegetation. In a part of this region, the lower half of the Bahr-el-Jebel, occur from time to time those blocks of drift vegetation known as 'sadd', which impede navigation, and may divert the course of the stream, whose former channels then remain as lagoons amid the marshes of the valley.

Falls and
ratios of
slope.

In the upper reaches both the Victoria Nile and the Semliki River descend very rapidly from the equatorial plateau in several series of rapids, interrupted by intervals of gentler slope, to Gondokoro or Mongalla on the Bahr-el-Jebel. Then there follows a length of 1,060 miles from this point to Khartoum in which the river falls only 180 feet, or at the average rate of only two inches per mile. Beyond this point the slope again increases, and the river descends some 800 feet in 1,200 miles in passing the several cataracts between Khartoum and Aswan, after which it flows through Egypt, with a fall of from five to six inches per mile. Thus there is first an unnavigable portion, then a long and easy waterway which is separated by the cataract portion, which is only partially navigable, from the valley of Egypt where the Nile furnishes the best means of communication.

The equa-
torial and
Abys-
sinian
plateaus
and the
water they
supply.

The comparatively recent movement of blocks of the earth's crust on the equatorial plateau is shown by the very moderate amount of weathering which has as yet taken place, and by the very incomplete development of the drainage systems there; lakes, marshes, and river reaches of low slope, which are choked with reeds and water plants, alternate with rapids and rocky stream-beds, down which the water rushes to deposit its load of detritus in another lake or valley floor lower down. In this way the water which flows over the Ripon Falls pours down sixty miles of rapids, and then joins the still waters of Lake Choga; at Foweira fifty miles of rapids begin, which end at the Murchison Falls, 120 feet high; and immediately beyond these the material eroded from the rocky bed and brought in by tributary streams is

now forming extensive mud flats where the Victoria Nile enters Lake Albert. The Semliki River, after flowing northward for some fifty miles from Lake Edward, plunges down a series of rapids until it reaches the level of the Albert Lake, where it is building up a deltaic deposit which is steadily encroaching on the waters of the lake. Thus far, then, the Nile may be said to be in its mountain track, as it scours its way down the gorges which it is carving out in the masses of granite and gneiss which form the plateau. One hundred and thirty miles beyond the Albert Lake the Nile again plunges down ninety miles of rapids, the last step of the lake plateau, after which it flows gently through the plains of the Sudan.

Those tributaries which are fed by the summer rainfall of Abyssinia, the Sobat, the Blue Nile, the Atbara, and the Mareb, or Khor-el-Gash, all rise on the Abyssinian plateau at altitudes of 6,000 to 8,000 feet above sea-level, and pour down their deep-cut gorges until they reach the plains of the Sudan, where they have excavated meandering channels in the alluvial plain.

The quantity of water supplied by these two great gathering grounds would be very large but for certain geographical conditions which reduce that from the equatorial plateau to an almost constant supply of about 12,000 or 14,000 cubic feet per second, while the Abyssinian rivers, on the other hand, must furnish at times as much as about 500,000 cubic feet per second in a high flood.

In the majority of rivers the volume of water which they discharge increases from a very small amount near their sources to a maximum near the point where they empty themselves into the sea or an inland lake. With the Nile it is quite otherwise; not only has it a very marked seasonal change of volume, but from point to point of its course this volume varies greatly, now increasing and now decreasing as local conditions affect it. The maximum is reached in the flood season, where the Atbara joins the Nile, and from this point onwards the volume is diminished by evaporation, by seepage, and by the

Volume of
flow in
the Nile.

utilization of the water by the agricultural population of Egypt. The whole of this supply is furnished by a seasonal rainfall on the equatorial plateau, with its two rainy seasons and two dry seasons, and on the Abyssinian plateau and the Sudan plains which have but a single rainy season in the summer months. North of Berber practically no rain falls, and that which the northern part of the delta receives in winter does not reach the river.

The water-
supply of
the equa-
torial lake
plateau.

The supply effectively furnished to the river at different points by this rainfall is shown in Fig. 19 (p. 345), where each division of the vertical scale represents a discharge of 35,300 cubic ft. (1,000 c. metres) per second. The flood of the year 1903, which these diagrams represent, was in volume 11 per cent. below an average flood at Aswan. From this diagram we may see that, while the change of level of the Victoria Lake at different seasons of the year makes but little difference to the volume discharged, a strongly marked seasonal variation occurs at the Murchison Falls, where the low-stage volume is about 21,000 cubic feet per second, compared with 33,000 cubic feet in flood, and this increase is seen to be due to the rainfall from July to November on the northern edge of the plateau, since up-stream of Foweira the water level of the Victoria Nile varies but little, and such variation is taken up in the vast area of shallow lagoon and marsh known as Lake Choga, which lies on a step of the plateau some 100 miles to the northward. As a result of this regulating action of Lake Choga, the Victoria Nile at Mruli hardly varies in level, and its slight oscillations are determined by the local rains and not by the height of Lake Victoria. At Wadelai the river level varies with that of the Albert Lake, and the discharge shows a maximum toward the end of the year. But Lake Albert has a wholly different seasonal oscillation of level from that of Lake Victoria, since it receives a heavy rainfall in the late summer instead of experiencing a dry season then. It therefore rises slowly until the late months of the year, and then drops quickly. Receiving

the water of the Semliki River and the Victoria Nile, the same regulating effect is to be observed as in the case of Lake Choga, and the effective contribution of the whole group of rivers of the equatorial basin and its lakes to the Nile is that which we measure at the head of the Bahr-el-Jebel at Wadelai, that is, from 21,000 to 36,000 cubic feet per second. This is augmented each summer by the rains which feed the streams flowing down from the foothills of the plateau. As a result the volume of water passing Gondokoro on the northern confines of Uganda (at $4^{\circ} 55' \text{ N. lat.}$) varies from 21,000 to 28,000 cubic feet per second at low stage in April, and from 36,000 to 72,000 cubic feet per second when the river is at high flood in August.

At this point the river enters its shallow, narrow valley, which is rarely more than six miles wide, and lies but little lower than the general level of the plain on either side. The slope of this valley from Gondokoro to Lake No, where it joins the White Nile, is about 1 in 18,000, or five inches per mile on a distance of 469 miles, while the river slope varies from 1 in 4,000 between Gondokoro and Mongalla to 1 in 19,600 between Bor and Lake No. Now this is no very insufficient slope for such a river, so that there must be special reasons for the development of marshes and lagoons in the valley and the formation of those blocks of vegetation known as 'sadd', which have at times prevented all traffic on the river. The direct effect of these lagoons, the numberless water-channels which intersect the valley plain, and the dense hydrophilous vegetation which covers it, is to deduct from the main stream a very large supply of water, which is gradually disposed of by evaporation; and this action so reduces the river's volume that the discharge at Lake No varies only between 12,000 and 14,000 cubic feet per second, which is equivalent to an effective contribution at this point ($9^{\circ} 30' \text{ N. lat.}$) to the Lower Nile Valley of only 0.1 per cent. of the average rainfall on the whole area of the basin up-stream of it.

Lake No,
and the
rivers
flowing
to it.

The Bahr-el-Ghazal and the Bahr-el-Zaraf together

contribute from one-sixth to one-third of that furnished by the Bahr-el-Jebel, and this combined discharge represents the whole of the supply received by the Nile system which is not derived from the Abyssinian table-land.

The Sobat: Eighty-seven miles down-stream from Lake No we come to the River Sobat, which is the first tributary from the Abyssinian table-land, and consequently we find its regimen differing markedly from that of the rivers of the Lake Plateau. Here we have the effect of the Abyssinian rains, but the maximum is only reached in December, owing to the delaying effect of the plains of the Pibor River, a branch of the upper Sobat, which are flooded by the summer rains, and are only drained off gradually. The rains commence at the beginning of April, and after some interruptions set in definitely by June, and do not diminish until October. But this supply has a long way to come, and as the Victoria Nile and the Bahr-el-Jebel in North Uganda flow down reaches of cataracts and rapids, so also the Sobat pours down its steep bed from the plateau 6,000 to 9,000 feet above the sea-level through the foothills on to the level plains of the Sudan. By the time that its waters reach the White Nile all oscillations of level due to individual storms have disappeared, and a steady rise takes place from May to August, followed by a period of high level from September to December, after which a rapid fall begins. This protracted period of high level, which is maintained in spite of the fact that the rains end abruptly in October, is due to the water draining off the plains lying to the south on the banks of the Pibor River, for these are flooded for miles by the combined effect of the rain and the overflowing rivers.

The effect of the Sobat on the regimen of the White Nile is twofold. We have seen that the volume discharged by the Bahr-el-Jebel is practically constant throughout the year, and that of the Bahr-el-Ghazal is very small; the Bahr-el-Zaraf does not vary greatly, and discharges but a small volume. Consequently the flood of the White Nile from Lake No to Khartoum is due to

the waters of the Sobat River, for in high flood its level rises from ten to twelve feet above that of the low stage, and thus a corresponding rise is caused in the water-level of the rivers up-stream of it through their waters being

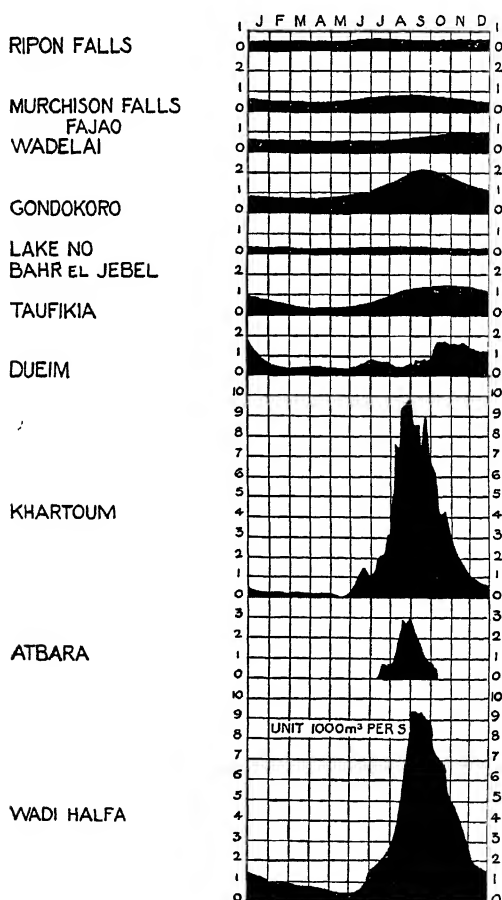


FIG. 19. Monthly discharge of the Nile at various stations

ponded up by those of the Sobat. Thus the high level of the Sobat is a very important factor in causing the flooding of the lagoons, which occur widely in the lower portion of the valley of the Bahr-el-Jebel, and in this way it is directly conducive to the formation of the sadd-blocks.

The White Nile carries the volume supplied by the Bahr-el-Jebel, Bahr-el-Zaraf, and Bahr-el-Ghazal, together with whatever is supplied by the Sobat—that is to say, from about 14,000 cubic feet per second as a minimum to about four times that amount in flood-time.

The Blue
Nile and
Atbara.

At Khartoum, too, where the Blue Nile and White Nile join, a similar interaction occurs. The Blue Nile has a regimen very like that of the Sobat, since the monsoon rainfall of June to September in Abyssinia causes the river to rise in June, to reach its maximum at Khartoum about the end of the first week in September, and then to fall rapidly. Its volume when in flood is very great, some fifteen times that of the White Nile, and the rise in level amounts to some twenty-two feet; from these two phenomena striking results ensue. The slope of the White Nile is very low, being on the average but five-eighths of an inch per mile for 520 miles up-stream of Khartoum, so that when the Blue Nile has risen a certain amount the lower portion of the White Nile is ponded back, and forms a practically level reach of water some 280 miles in length, which then rises and falls with the level of the Blue Nile. The discharge from this natural reservoir becomes very small, amounting only to that which is not needed to fill its valley up to the level of the Blue Nile, so that during August and September we have the curious phenomenon that the whole of the Nile basin up-stream of Khartoum, comprising the subsidiary basins of the equatorial lakes, the Bahr-el-Jebel and Bahr-el-Ghazal, the Sobat and the White Nile, is practically ineffective in causing or contributing to the Nile flood of Egypt and Nubia.

The Blue Nile flood flows down to Egypt carrying in suspension its load of silt, which has been derived from the weathered basalt of Abyssinia, and only later, when it begins to diminish, is the fall of the river-levels in the lower reaches of the Nile in Egypt delayed by the release of the ponded waters of the White Nile. Beyond this the river follows a normal course; it is eroding the various cataracts, and is depositing its load of suspended material on the flood-plain and delta of Egypt.

In one respect the behaviour of the Nile as a perennial stream flowing through a rainless region differs markedly from that of a river in a humid country. In the latter case the subsoil water-table or the surface of the permanently saturated soil is approximately parallel to the surface of the ground, and therefore slopes down to the stream level, and small springs contribute ceaselessly to the river. In an arid region this water-table is far below the surface of the ground in most cases, and a water-channel stands on a ridge of saturated soil or rock, so that the river is not gaining, but is continually losing water, which flows down the slope of this depressed water-table. It is this constant drain on the supply of streams in rainless regions that renders it difficult for them to maintain themselves across stretches of arid lands. But this line of saturation is in contact with the river bed at a point rather above the lowest level of the river, so that at the lowest stage a certain small amount of water drains back into the river, and observations show that it may furnish some 3,000 cubic feet per second to the Nile in Nubia at a time when every drop is of importance.

The Nile
in the
desert.

The diagram, Fig. 19, showing the volume of water which is discharged at Wadi Halfa, makes clear the resultant effect of the two sources of supply—the Blue and the White Niles. At the beginning of the year the discharge of the Blue Nile has diminished to a very small amount; the Sobat is furnishing a considerable supply to supplement the constant volume delivered by the Bahr-el-Jebel, and to increase the water which had been stored in the White Nile Valley, but which is now rapidly running off. From this time until May the volume of the Blue Nile and that of the Sobat decrease rapidly, the water stored in the White Nile has drained off by the end of January, and all that is available for Nubia and Egypt is the water from the equatorial plateau supplemented by such small supply as the Sobat and the Blue Nile may still bring down, as well as by a certain amount which drains back into the river from the flood-plains and the permeable sandstone which forms the valley sides. This, then, is the

Volume
of flow
at Wadi
Halfa :
effects of
discharge
of Blue
and White
Niles.

time of Egypt's greatest need, and increasing cultivation has necessitated the construction of reservoirs and regulating dams by means of which the surplus water of November and December can be stored up and supplied during the period of deficiency which lasts through May, June, and July. It is easy to see now what will cause deficiency in the low-stage supply, since that which arrives from the equatorial plateau is constant throughout the year; weak rains in Abyssinia, which end earlier in the autumn than usual, will cause the Sobat and the Blue Nile to fall to their minimum early in the spring months; the low flood will have held up less water in the White Nile Valley, a lesser thickness of alluvium in the valley will have been saturated, so that the variable sources of supply will be much reduced.

The great
reservoirs.

It will be seen that, with such a reduction of the water-supply in the first half of the year, continuous cultivation of the arable land was impossible until engineering works had been constructed which would raise the level of the water sufficiently for it to flow into the perennial supply canals, and until reservoirs existed in which the surplus water of the autumn could be stored for later use. Previously the water was led on to the flood-plains of Egypt by canals, at the season when the river was at its highest, August, so that it might there deposit the silt which it carried in suspension and thoroughly soak the soil in preparation for the crop which was to follow; on this newly deposited silt and the water-soaked land the seed was sown immediately after the flood water had drained off. Until recent times land in Egypt which was not watered by the flood could not be cultivated for that year unless it was situated on the bank of the river, or close to wells which had been sunk in the alluvial plain, so that the crops could be watered artificially. Hence the flood was all-important; and one that did not reach the requisite level caused scarcity, want, or even famine. Modern skill has greatly changed these natural conditions until the whole of the delta and a large part of the valley north of Assiut now receive water throughout

the year by the aid of the regulating dams at Assiut, near Cairo, and at Zifta, which enable the water to be turned into high-level canals ; the Aswan reservoir furnishes an extra supply at the season when the normal volume of the river is insufficient for the demands made upon it by the present amount of cultivation. At Esna, in Upper Egypt, the new regulating dam renders it possible to turn the flood waters on to the higher lands in the province of Kena which are not watered by a low flood, and so ensures their yearly cultivation. Finally, the recent increase in the height of the dam at Aswan allows a larger amount of water to be stored in the valley of Nubia, and by its aid large tracts of land in the north of the delta will shortly be reclaimed and brought under cultivation.

Man has thus so altered the conditions of the water-supply in the lower reaches of the Nile, that in future the flood will no longer have the same pre-eminent importance that it once enjoyed. At the time of full flood there is always more water than can be utilized, and now the Esna work will enable the high land to be flooded even in years of deficient supply. It is the low-stage supply, on which the cotton crop depends, that is now most anxiously studied.

Attention has now been directed to the plains of the Sudan, and projects are in hand for utilizing some of the surplus water of the Blue Nile when it is in flood to water the gently sloping alluvial plain known as the ' Gezira ', which lies between the Blue and White Niles. Here canals will distribute the water over a large tract of cultivable land which has hitherto been dependent on the uncertain rain-storms of the rainy season, which in some years were insufficient to produce an adequate harvest. In such cases the population suffered severely from famine, for the rest of the year is hot and rainless.

Irrigation
in the
plains of
the Sudan.

Vegetation

In an arid region the lack of moisture reduces the amount of vegetation to its lowest limits, and throughout

Desert.

Egypt and the greater part of the northern Sudan, until we reach the limits of the monsoon rains, vegetation is restricted to a few favoured spots. In strong contrast to the fertile strip of alluvium through which the Nile flows, the bare desert begins at the point where the river floods end, and extends for hundreds of miles east and west. In the drainage lines of the desert and in the valleys of the Red Sea hills a few stunted acacias, occasional tufts of coarse grass, and a few hardy desert plants are to be found here and there. The want of moisture alone causes this dearth of plant life, for in the oases where deep-seated springs occur we find as luxuriant a growth as in the Nile Valley, and in a few spots in the hill regions, such as the Wadi Feiran in the Sinai peninsula, dense groves of the date palm and of orange, fig, and acacia occur, while from springs high up in the Red Sea hills a small stream which flows for a few yards on the shady floor of a deep ravine may support a dense growth of maidenhair fern, &c.

Scrub and
forest.

But under desert conditions vegetation is extremely scanty, and it is not until we reach the region of the monsoon rains that the bare desert gives way at first to the scrub or 'thorn savana' with its coarse grass and scattered acacia trees, and this in turn to the somewhat denser thorn forest. On the Sudan plains, between the Nile and the Abyssinian foothills on the east and the plains of Kordofan and Darfur to the west, we meet to the south of the 16th parallel the gum-bearing acacia in sufficient numbers to provide gum arabic in such quantity as to form a valuable economic product of the country. Several varieties of acacia with 'balanites' and scattered baobab trees make up the thorn forest of the Sudan plains, which along the main rivers, such as the Blue Nile, in the foothills of the Abyssinian table-land, and in southern Kordofan, passes into a mixed forest of baobabs and other trees, together with the dom palm, and on the Sobat the borassus palm. In the heavier rainfall of western Abyssinia the bamboo grows luxuriantly on the hill-slopes, where a dense forest flourishes.

To the south of latitude 10° N. the thorn forest still occupies the level plains, but as the land rises in the upper basin of the Sobat, towards the Nile-Congo watershed, and near the foothills of the equatorial plateau, it passes at first into the park landscape of large scattered trees and then into the mixed forest of *Landolphia*, *Khaya*, *Berlinia*, *Daniellia*, &c. But along the river valleys, where ample moisture is available during the dry season, we meet with a much denser growth of trees, &c., forming belts of forest lining the banks of the rivers, the gallery forests of *Schweinfurth*. Further south, amid the heavy rainfall of the equatorial plateau, this mixed forest passes into the typical rain-forest of the equatorial zone.

Besides the thorn-forest which is typical of the plains Marshes. of the southern Sudan the slowly flowing rivers and lagoons furnish favourable conditions for the luxuriant growth of marsh vegetation. In the hot climate, when the heavy rainfall floods large areas of plain and converts all depressions into vast lagoons, wide tracts are densely covered with marsh vegetation, and along the river margins, and on their inundated flood-plains, papyrus, reeds, grasses, ambatch, and many kinds of hydrophilous plants grow in the greatest luxuriance. On the plains much of this disappears in the dry season as the water evaporates, but along the rivers and their lagoons growth continues throughout the year.

The marshes of the Bahr-el-Jebel and the Bahr-el-Ghazal, though very extensive, are not so vast as they have been represented, and the earlier estimates of those of the Bahr-el-Jebel in particular have been much reduced by the results of recent surveys. This river flows in a very shallow valley from 5 to 15 miles wide, in which at flood-stage the water in the lower reaches is on a level with, or even slightly above, the surface of the flood-plain, and even in the upper reaches is but little below it. The abrupt change from the steeply sloping bed above Gondokoro to the level plain below it causes most of the suspended matter to be deposited in the upper part of its

Bahr-el-Jebel and
Bahr-el-Ghazal.

course, and little if any sedimentation is as yet taking place in the middle and lower reaches. Consequently the sides of the flood-plains are still occupied by large lagoons, which are filled in the rainy season and slowly evaporate during the other half of the year ; these, as well as former bends and branches of the river, which changes of the main channel have left as isolated depressions standing full of water, furnish suitable places for the growth of papyrus and other marsh vegetation. Five hundred miles of such a marsh-grown valley can not only utilize the rainfall of 30 to 35 inches which falls on it, but can receive also all the water that flows out of the main stream by numerous branches and side-channels ; much is taken up by the dense growth of marsh plants, and the dry winds which blow from November to April over the parched plains of the Sudan rapidly carry off a vast quantity of moisture ; thus it is that the trebling in the rainy season of the volume of the river where it passes Gondokoro has no effect on the quantity which leaves the river to join the White Nile at Lake No. The descriptions of the vast marshes, the rank vegetation which blocks the river bed, the difficulty of recognizing the true river channel, have given rise to an impression that the Bahr-el-Jebel has no defined bed, but is a shallow stream losing itself in the lagoons. But this is far from being the general case, for all the rivers of these plains excavate for themselves well-defined, steep-sided channels in which they flow. The difficulty of recognizing them is due to the fact that they flow almost at the same level as their flood-plains, and, being free from suspended matter, are not building them up. Conditions are therefore favourable to the growth of marsh vegetation, which extends wherever the water reaches, and is often able to choke the smaller channels by its growth.

Sadd.

In the lower reaches of the Bahr-el-Ghazal and the Bahr-el-Jebel the flood-plains lie lower, and the marshes are inundated for a considerable part of the year, from June to December ; but this is due not so much to the local rains as to the flood in the Sobat River. The



PLATE XIX (a) KAWA, WHITE NILE



PLATE XIX (b). FLOATING BLOCKS OF SADD
(Photos. Mr. M. S. Thompson)



PLATE XX (*a*). AT ABU HAMED, ANGLO-EGYPTIAN SUDAN



PLATE XX (*b*). THE DESERT NEAR ROGEL
(Photo by Mr. M. S. Thompson)

country is here so flat that the rise of water-level of the Sobat at flood stage raises the water-level up-stream for many miles in the White Nile, the Bahr-el-Jebel, and the Bahr-el-Ghazal rivers, and in their lagoons; this facilitates the detachment of the plants growing on the bottom of the marshes by storms of wind. When once set free, these masses of vegetation are drifted by the wind and current into the main river channel, where they may be arrested at a narrow part or at a sharp bend. More masses are constantly arriving, and soon the block extends across the channel, and in time may completely close it. These sadd-blocks have occurred principally in the last 100 miles of the Bahr-el-Jebel immediately above Lake No, a few only having been formed farther south near Ghaba Shambe, where the wide marshes in which the Bahr-el-Zaraf takes its rise, cause a rise of the river-level of Bahr-el-Jebel in the rainy season, and so facilitate the setting free of the grass, reeds, and water plants, which may then form a sadd-block. A rise of water-level in the lagoons is therefore an important cause of these blocks, while stormy weather and a narrow, meandering river furnish the rest of the necessary conditions.

In the marsh region of the Bahr-el-Ghazal the rivers are for the most part shallower, and the vegetation which blocks them is oftener growing on the bed of the stream than drifted into it as loose material derived from the lagoons.

In an arid region where plant life is scantily developed, animal life is also sparsely represented. In the deserts of Egypt gazelle, jackal, fox, and more rarely the hyena are to be seen, and in the hilly region along the western shore of the Red Sea and the Gulf of Suez the ibex and, in a few places the wild sheep occur. The black leopard occurs in the ravines of southern Sinai. In the Nile valley the horse, and especially the ass and camel, are domesticated for use in transport and in agriculture. The Egyptian cattle have been largely supplemented by the water buffalo, which is less liable to cattle plague. Chickens and pigeons are raised in large numbers in the villages.

Passing southward into the Sudan there is not much change until the region of the monsoon rains is reached, save that the camel of the desert and valley of Upper Egypt and Nubia is of a lighter type than those which are seen in the delta. They are largely bred by the Ababda and Bisharin Arabs in the eastern desert, where they find grazing in the valleys of the Red Sea hills.

As soon as more favourable climatic conditions provide a more generous vegetation, the animal life increases, and south of Dongola the Arab tribes of the deserts possess vast herds of camels, cattle, sheep, and goats. Gazelle are numerous, and in Kordofan and in the Gezira, as well as in the eastern plains of the Sudan, antelopes are widely distributed, being exceedingly numerous in the upper basin of the Atbara, the Blue Nile, and near the Bahr-el-Ghazal. Lions likewise occur preying on the big game of these parts.

Among the larger animals of the southern Sudan are the wild buffalo, the giraffe, the rhinoceros, and in the Nile and its tributaries above Khartoum, as well as in the Atbara, the crocodile and hippopotamus are common. Elephants occur in large numbers in the basin of the Bahr-el-Jebel and the Bahr-el-Ghazal, while they also occur in the mixed forest which clothes the foothills of the Abyssinian table-land.

Economic Conditions

Utiliza-
tion of
water.

Throughout the whole of Egypt and also the northern part of the Sudan, where the rainfall is too scanty to support vegetation, the Nile is almost the only source of water for the agriculturist. The springs of the oases supply a very small area in their immediate vicinity.

As has been already explained, the Nile begins to rise in the month of June at Aswan and reaches its maximum level there in September. Its waters, laden with the silt derived mainly from the Abyssinian table-land, inundate its flood-plains in Egypt, through which it flows and thus annually waters the soil. As the river-level falls during the autumn the water drains off from the flooded lands

and the farmer can sow his field in November and December. From this time onwards the river-level falls steadily until the next summer's flood arrives. Thus under natural conditions the land bordering the Nile receives an annual watering, and for the rest of the year is dependent on such moisture as had been stored up in it and was sufficiently near the surface to be within reach of the vegetation.

From very early times man has exerted himself to use this annual inundation to the best advantage, and as early as 5,000 years ago the maximum level reached by the flood in each year was recorded on account of its economic importance to the country. The advantages of leading the flood-water on to the cultivated lands by canals, instead of depending on the natural inundation of the valley, was early recognized, and in order that the silt which it carried in suspension might be deposited on the fields, transverse dykes were constructed so as to divide up the country into basins. The turbid flood-water was thus led on to the land until it covered it to a depth of some four or five feet, and remained there for some six weeks until the silt had been deposited and the land was thoroughly soaked; then so soon as the level of the river had fallen sufficiently low the water was allowed to drain back into the river through a cut in the retaining banks. This system, known as 'basin' irrigation, was early developed and was gradually carried to great perfection; it is still in use in Upper Egypt, and is about to be introduced in the Sudan in the portion lying between the Blue and White Nile which is known as the 'Gezira'.

This system was well suited to the raising of cereals and green crops, for they were sown on the mud in November as soon as the water had drained off; they grew rapidly in the warm spring months, and ripening in the early summer heat, they were harvested in April and May, after which the land lay fallow, except on the banks of the river and main canals, until after the next flood. But when Muhammad Ali introduced the cultivation of cotton into Egypt in the early years of the nineteenth

Basin
irrigation.

Perennial
irrigation.

century he initiated a far-reaching change in the agricultural economy of the country. This crop, which is now by far the most valuable in Egypt, is sown in March and grows during the summer months, and the ripe cotton is picked in September. An assured water-supply is therefore required during the months of April, May, and June, when the Nile is normally at its lowest level. He therefore deepened the main canals of the delta, and constructed a barrage at its apex, by which the water of the river could be held up until it flowed into the main supply canals and thence on to the cultivated land at all seasons of the year.

This system of perennial irrigation which was introduced to supply the needs of the summer crops has received an immense extension during the last thirty years in order to provide for the increasing planting of cotton. The Delta Barrage, which was at first a failure, has been put into a serviceable condition; a great dam has been constructed at the First Cataract in order to store up the surplus water in November, December, and January, when the river is carrying more than the country needs, and to supply it from May to August, when the cultivated land needs more than the river can supply; another barrage has been built at Assiut to facilitate supplying the main canals in Middle Egypt. At the present time, therefore, the whole of the delta, and the Nile valley as far south as Assiut, except a narrow strip of land to the east of the river, receive a perennial supply of water; to the south of this point basin irrigation continues, and a barrage which has been recently built at Esna now ensures that the higher land near Kena and Luxor will be adequately supplied even in years of deficient flood.

Irrigation
in Nubia
and the
Sudan.

In Nubia and in the northern Sudan the cultivable area along the river is very small, and often consists of isolated patches of alluvial soil separated by stretches of rocky desert. Here canals occur but exceptionally, and irrigation is carried on by means of the water-wheel (*sakia*) or the bucket-sweep (*shaduf*), which are also employed largely by the cultivator throughout Egypt.

Somewhat to the north of Berber and Khartoum we reach the limits of the tropical rains, and from here southwards cultivation away from the river bank is dependent on the summer rainfall, which usually suffices for an adequate crop of millet (durrha), on which the semi-nomad population largely subsist. At the present time the resources of the Sudan are being greatly developed and schemes for irrigating large areas of land lying between the Blue and White Nile by means of water taken from the former river when in flood are being actively proceeded with, which will increase greatly the cultivable lands of the Sudan.

While the Sudan has the advantage of a rainy season in its southern portion, the Nile alone supplies the agriculturist in the North Sudan, Nubia, and Egypt. The settled population of the first two regions is scanty, but Egypt possesses a large and densely settled agricultural population whose need of water has increased greatly since the cultivation of summer crops became general. ^{Annual water cycle in Egypt.}

The annual routine is now as follows: In November, when the level of the Nile is falling and the whole country is amply supplied, the sluice gates of the Aswan Dam are partially closed, and the valley of Nubia up-stream of it is gradually filled. In April or May, when the river-supply is insufficient, this reservoir in Nubia is drawn upon, and the water is distributed throughout the country as economically as possible, short periods of supply alternating with periods in which the water is diverted to another reach of the canal. By the latter part of August the rising flood is usually abundant enough for these restrictions to be dispensed with, and both basin lands and the perennially irrigated fields receive all that they require. The prosperity of the country depends on this distribution of water being controlled by a central authority, so that every area shall be equally favourably supplied. Throughout past history, whenever the central authority was weak and disorder prevailed in the Nile valley the irrigation system became disorganized and

want and famine soon followed in spite of the natural richness of the country.

Agricultural
seasons.

The divisions of the agricultural year are determined by the annual flood, and in the earliest historical times three seasons were already recognized: the period of the inundation, from the end of June to the end of October; the growing of the crops, from the end of October to the end of February; and that of the harvest, which lasted from the end of February to the end of June. At the present time these three seasons have been slightly altered, and in Egypt there are the two principal seasons, that of winter cultivation, lasting from October or November to April or May, and the season of the summer crops, which is from April to August in land under basin irrigation, and to October where there is perennial irrigation. There is in some areas a short autumn season of about seventy days between September and the end of November, in which maize or millet is extensively grown. In the Sudan the year may conveniently be divided into a summer and a winter season until the region of the monsoon rains is reached, where a rainy season from about May to October precedes the winter months and follows the hot months of the dry summer.

Soil and
crops.

In the Nile valley, wherever it is sufficiently broad to admit of continuous areas of cultivation, the land is exceedingly fertile. Formed of a fine alluvial silt which has been mainly derived from the weathering of the basalt plateau of Abyssinia, and watered by the Nile, it bears a succession of crops. But it is not so incapable of exhaustion as has sometimes been represented. When but one principal crop was grown in the year immediately after the flood had receded, the layer of silt which the land received with each flood under the system of basin irrigation enabled this constant cultivation to be carried on successfully; but now that two and three crops are raised annually on perennially irrigated land which receives far less silt than the basin areas, artificial manuring has to be largely resorted to. Sugar-cane and cotton, which are now important crops, are of an exhausting

character, and while the nitrous earth from ancient town sites sufficed as a cheap fertilizer for a while, chemical manures and careful management are now necessary to keep the rich lands of Egypt at their best. In the Sudan the scanty and widely scattered population can select the most suitable lands for cultivation, but here, where the alluvial flood-plains of the rivers are rare, rainfall has to be mainly relied upon and comparatively small areas are as yet worked. With the introduction of irrigation, however, there should be a great increase, for there are vast areas of suitable soil, and the plains of the Sudan promise to become one of the most important cotton-producing areas of the world.

Besides cotton and sugar, cereals are extensively grown in Egypt, the principal kinds being wheat, barley, maize, millet, and rice in the northern part of the delta. Beans, lentils, lupins, &c., are largely grown, as well as onions, which are exported to Europe. A white clover (*bersim*) is universally grown for fodder, and is also of especial value as a nitrogenous crop to be raised before planting cotton. In the Sudan millet is at present the principal cereal crop.

Trees are not numerous in kind, as may be anticipated Trees. from the arid nature of the climate. The date palm is the most important, its fruit being of value for food, and the leaves, bast, &c., are utilized for many purposes. It grows luxuriantly in the Nile valley of Egypt and Nubia and in the Western oases. The sycamore and the Nile acacia are common on the river flood-plains, while many imported trees, especially the 'lebbek' (*Albizzia lebbek*), have been largely planted round the towns. In the desert trees only occur in the wadis or dry valleys, where different kinds of hardy acacia occur in the more favoured spots. Farther south the same poverty of vegetation continues until we reach the fringe of the monsoon rains, when the bare desert begins to pass into the thorn savana and the gum-bearing acacias increase and furnish a valuable item of the export trade of the Sudan. Farther south, beyond Khartoum, larger trees,

the baobab, the borassus palm, the balanites occur, and on the higher ground up the Blue Nile and the Sobat towards the Abyssinian table-land, and also in the foothills of the equatorial plateau, the scattered trees of the 'park-land' country pass into the mixed forest which grows in regions of heavier rainfall.

Methods
of cultivation.

Both in Egypt and the Sudan the methods of agriculture are simple and primitive; in the former country holdings are small, and the cultivator finds the rude plough, hoe, &c., which have changed little since the earliest times, are still sufficient for his needs. On large properties modern machinery is employed, but these form but a very small proportion of the whole area. In the Sudan the methods are even ruder, for where rain-crops are raised the ground is roughly opened with a sort of hoe, the seed is dropped in, and receives no further attention until the harvest.

Minerals.

The mineral resources of Egypt and the Anglo-Egyptian Sudan are not very important, and the waterless character of large areas, the deficiency of fuel, a scanty supply of labour, and difficulties of transport have militated against their development. In very early historical times copper was procured from the Sinaitic peninsula as well as malachite and turquoise. At an early date also the Nubian desert furnished gold in some quantity, and gold-mining with the aid of prisoners' labour was actively prosecuted in the Red Sea hills twenty centuries and more before our era, while the Sudan also furnished a supply of the same precious metal, either as tribute or by trade, or as the booty of plundering raids. Emeralds and beryl were also worked in the hills of Jebel Zubara on the Red Sea coast, and other less valuable stones were obtained from this region. But all this exploitation of precious stones and minerals did not represent a very active or widely prosecuted industry, and the demand for them was a limited one. In Arab times some of the sites were worked successfully, and during the last few years prospecting has been seriously carried on. Difficulties of fuel, water, and transport make the development of such

mining undertaking expensive, but some localities are being profitably worked. The native inhabitants of the western foothills of Abyssinia obtain a fair return in gold from washing the river sands.

The localities whence the inhabitants could procure building and ornamental stone have always been more extensively worked in Egypt than the mineral deposits, and in ancient times the granite of Aswan, the diorite, porphyry, basalt, marble, &c., from the hills in the eastern desert were extensively worked for the provision of statues, inscribed monuments, and for the decoration of temples. At the present time there is not a sufficient demand for these ornamental stones to justify re-opening the ancient quarries which are mostly at a distance from the river and from the sea-coast; but there is a very large industry in quarrying limestone from the desert plateaus which border the Nile in Egypt, and sandstone in Nubia and in the Sudan near Khartoum. These stones were used largely in the construction of both tombs and temples in ancient times, and if not subjected to alternate drying and wetting in the presence of soluble salts are fairly durable, as may be seen from the quay walls and stairways of the ancient temples which still remain on the Nile banks, and those portions of them which are out of reach of the damp of the cultivated soil.

At the present day the erection of better houses, public buildings, and the numerous works required in connexion with the improved irrigation of the country make large demands on these modern quarries.

Salt is obtained from lagoons near the margin of the Salt delta, from the saline lakes of the Wadi Natrun in the western desert, from natural salines along the Red Sea coast, and at many points in the desert where small deposits occur and are regularly exploited by the wandering Beduin.

Mineral oil occurs on the western shore of the Gulf of Oil. Suez at Jemsa and Jebel Zeit, and of late years much has been done to investigate the probable value and richness of the oil deposits. Several deep borings have

been made and some success has been met with in the development of an industry which, if fully successful, will be of the greatest importance to both Egypt and the Sudan.

Manufac-
turing
industries.

Manufactures are comparatively few and are such as meet the local needs of the inhabitants, being therefore mostly used in the country and not exported. A cloth woven by hand from the wool of their flocks is worn by many of the people, and cotton is also largely woven for local requirements, but the great bulk of the textiles which are used is imported from Europe. Pottery is manufactured at many parts of the country, and the produce of special towns, which have a reputation for the quality of their pottery, is carried far up and down the river for sale.

Communi-
cations.

Until the middle of the last century the Nile and the caravan routes of the desert were the only lines of communication along which trade was carried on. Cairo was then connected with Alexandria, Suez, and Middle Egypt by railway, but it is during the last twenty years that railway transport has had its greatest extension ; first to Aswan, then from Wadi Halfa to Khartoum, and now on to points on the Blue and White Nile, with a branch line from El Damer, reaching the Red Sea at Port Sudan near Suakin : there is now railway communication from Cairo and Alexandria to the Red Sea coast, the Sudan, and Kordofan, except for a short interval between Aswan and Wadi Halfa.

The river
route :

The Nile has always been the main line of communication in Egypt and Nubia, and at the present time hundreds of sailing boats and numerous steamers ply on its waters, carrying produce to and from the different towns on its banks. Flowing generally from north to south, it offers the especial advantage that boats can sail up-stream with the prevailing northerly winds of the trade region, and then lowering their yards and sails, can return northwards, drifting with the current of the river ; thus a constant communication may be maintained up and down throughout the year. The Nile communicates with the Mediter-

anean Sea by its two branches which enter the sea at Rosetta and Damietta, but on account of the quantity of suspended material which is brought down by the river, and deposited at its junction with the sea, the depth of water over the bar thus formed is small and only vessels of shallow draught can enter. Indeed, at the low stage of the river all ingress is prevented, since the river water is all required for the irrigation of the delta, and therefore the sea water has to be kept out of the river bed by a dam at the mouth of each deltaic arm of the river.

From the delta to Aswan the Nile still maintains its importance in spite of railway competition, for it is the more economical means of transporting all the more bulky and imperishable products of the country, and also the coal and building materials which are now largely imported. At Aswan the resistant crystalline rocks occurring in the bed of the river form three miles of rapids, through which boats were formerly toilsomely dragged, but now since the construction of the great dam they can pass through a series of locks into the Nubian valley of the Nile. The break in the navigable waterway made the town of Aswan for some time a place of some importance. At first the rapids so hindered transport that all goods for the Sudan passed by caravans through the desert and Aswan was little used. The expeditions of 1884 and the following years, and the maintenance of the frontier at Wadi Halfa until 1896, and the reconquest of the Sudan after that date, made this line of transport most important, and Aswan developed largely as a *dépôt* and a transmitting station, but with the opening of Port Sudan and the completion of the railway from Khartoum to the Red Sea, its rise has been checked.

South of Aswan the Nile, though having several long navigable reaches of several hundred miles in length, loses much of its value on account of the rapids which separate them. The rapids of the Second Cataract just south of Wadi Halfa have a length of 20 miles, and above them the minor rapids of Semna, Wadi Atiri, Ambigol,

North of
Aswan ;

South of
Aswan ;

and Tanjur interrupt the waterway ; these are followed at intervals by others, and then an open reach of about 80 miles brings us to the rapids of the Third Cataract ; a farther open reach of about 200 miles intervenes between the Third and Fourth Cataract ; and about 80 miles divides the latter from the Fifth. Thus, the Nile in Nubia is of little more than local importance as a navigable waterway.

South of
Khar-
toun.

Above Khartoum conditions change. The Blue Nile is navigable in flood up to the Abyssinian frontier near Famaka, but its waters rapidly fall, and steamers can only ascend for a limited distance after December. Similarly the Atbara, after the winter, becomes soon a series of pools and of no use for transport. On the other hand, the White Nile has always been of the greatest importance to the traders of the Sudan, for the Albert Lake provides a constant minimum supply throughout the dry season, and with what is brought down by the Sobat, the White Nile has water enough at all times of the year for steamers and sailing craft to ply on it. As soon as the southerly winds of the rainy season cease, and the north-east trade-winds again extend southwards of Khartoum, sailing boats are able to voyage up the White Nile and its tributaries, the Sobat, the Bahr-el-Jebel, the Bahr-el-Zaraf, and the Bahr-el-Ghazal, to obtain the produce of the sub-equatorial regions.

Canal
routes.

Besides the Nile itself, there is a large amount of transport carried on by means of the larger canals of Egypt, where the Sohagia and Ibrahimia canals, and the Bahr Jusuf, an ancient side channel of the river, supply many towns which are remote from the banks of the Nile itself. In the delta, too, there are some six or eight main canals which are largely used for navigation as well as for carrying water to irrigate the land, and the Mahmudia canal, which leads from the Rosetta branch of the Nile to the city of Alexandria, may be specially mentioned, since it not only provides the town with an inland waterway, but also furnishes its water-supply.

Railways.

Railways have now come to compete with the river and canals, and at the present time the State railways of

Egypt run from Aswan to the ports of Alexandria, Port Said, and Suez, while a network of light railways covers the delta to bring the produce of the land to the railway system. In the Sudan the railway is required to connect the principal centres of production and supply; Wadi Halfa, at the southern end of the navigable reach of the river beyond the First Cataract, is the nearest point of the Sudan railway system to Egypt. Port Sudan, near Suakin on the Red Sea, is its seaport, and from these two points lines run to Khartoum, the centre of Sudan administration, joining at El Damer on the Atbara, near Berber. Extensions have now been pushed on up the Blue Nile into the fertile land of the Gezira where cotton can be profitably grown, and from Sennar the line crosses westwards to the White Nile and thence to El Obeid into the region of the gum-bearing acacia.

Before railways were available to link up the navigable reaches of the Nile and to bring the Red Sea ports into touch with the heart of the Sudan, caravans numbering sometimes several thousand camels crossed the deserts from north to south and from east to west. Great caravans from Murzuk, in the hinterland of Tripoli, passed eastwards by the oases of Aujila, Siwa, &c., into northern Egypt; from Cairo and Assiut caravans passed southwards by the oasis of Kharga along the track known as the 'Derb el Arbain' into Darfur and Wadai. From Aswan and other points on the Nile in Upper Egypt, regular communication was kept up across the Nubian desert with Berber and Shendy, and thence caravans were constantly passing eastward to Suakin on the Red Sea coast. These caravans carried all the export trade of the Sudan in former days, and in the case of the great caravans from Wadai and Darfur they brought produce of the equatorial lands to Cairo, which was the great dépôt and market-place for western, southern, and eastern produce before the Suez Canal was made. Their progress was slow, months being occupied in some of the longer journeys, for long halts were made at points on the route to feed and water the camels. Such caravans were costly,

and only produce which was valuable and could be easily transported was worth the outlay involved. Consequently the caravans which moved between east and west carried silk, carpets, precious stones, and articles of a costly nature which would repay the cost of carriage. The caravans from the south brought gold, ivory, ostrich feathers, gum, and especially slaves, whom the traders bought or captured from the negro tribes of the equatorial districts. For all these Cairo was the great *dépôt* and market where such merchandise was sold or exchanged for transport to other countries. The suppression of the slave-trade practically put an end to the caravans from the south by reducing the profits to be made, and after the re-conquest of the Sudan had stimulated trade, which had greatly dwindled during the fourteen years of the Dervish power, the extension of the railway system has turned the local camel transport into a collector which brings produce to the railway and to the river-steamers for export.

People

Fellahin. Much additional knowledge has been gained in recent years of the origin of the ancestors of the modern inhabitants of Egypt and Nubia. Systematic excavation and the careful study of the human remains which have thus been brought to light have shown that in very early times, some 5,000 years ago, one population of uniform character occupied the Nile valley in Egypt and Lower Nubia. This river valley, which leads from the fertile equatorial regions, must always have been populated, but for long ages the marshes occupied much of the valley floor, and settlements could only be formed in favoured spots. The scattered population which settled along the banks of the Nile was closely related to the peoples who occupied the sub-tropical coast-lands of Eastern Africa, and whose descendants, the Nubia, Beja, Danakil, Gala, and Somali populations still retain physical characteristics which demonstrate their relationship to the early Egyptians. From time to time waves of immigration northward

modified the Egyptians of Lower Nubia, and throughout their earliest history, as well as in later times, a continual movement of people and produce passed down the Nile.

As the silt-laden waters of the annual flood effected a slow reclamation of the valley lands of Egypt a concentration of inhabitants took place in this favourable region to the north of the First Cataract, and here they came within reach of the great inland waterway, the Mediterranean, whereby the peoples on its shores came in contact with the Egyptians. There is good evidence of the influence which the contact of the northern Egyptians with the Mediterranean races, and of the southern Egyptians with the negroid races dwelling to the southward, had on the early inhabitants of the Nile valley.

Since the complete settlement of this narrow belt of fertile land little change has taken place in the physical character of the inhabitants. Now, as then, they are mainly an agricultural people tilling the fertile alluvial lands of the valley. In Egypt the 'fellahin', as the bulk of this agricultural population is termed, are the true descendants of the ancient Egyptians, whom they still closely resemble in their physical character. The immigrations and incursions of foreign races, which by the nature of the country are restricted mainly to the delta on the north and the Nile valley on the south, have influenced the mass of the people less than is commonly supposed. By the seventh century Egypt and Nubia were wholly Christian, and although the Arab conquest of Egypt resulted in a change of language, and in course of time in a change of religion, the character of the fellahin was little affected. At the present day the great majority of the inhabitants are Muhammadans, there being now 10,250,000 of the former to about 900,000 Christians.

Besides these settled inhabitants in the valley there have always been a number of nomad tribes roving in the deserts who were related to the inhabitants of the valley. To-day these are represented by the Ababda, Bisharin, and Hadendowa tribes of the Nubian desert, and by

Unchanging
character
of the
fellahin.

a certain number of Arab nomads in the north who have come in from Arabia. The arid region of Upper Nubia and the northern Sudan restricts the population there to small settlements along the river and a small nomad population in the hilly regions of the desert. Farther southward, where the summer rains cause greater fertility, we find the modern descendants of the brown-skinned races who so largely peopled this north-eastern part of Africa, and on their southern and western limits the negro races of equatorial Africa with the mixed descendants of these two types. Here the inhabitants are largely pastoral and are therefore widely scattered, so that only approximate estimates are available, and the most reliable of these puts the population of the Anglo-Egyptian Sudan at about 2,000,000 in 1907.

Wherever Arab influence has established itself the religion is Muhammadanism, but the negro tribes of the White Nile are pagans.

Occupations.

The occupation of the inhabitants of this portion of north-eastern Africa is very strictly controlled by the climatic conditions which prevail. The almost rainless character of the greater portion of this region restricts the settled peoples to the immediate vicinity of the rivers or wells, and renders a very large proportion of the country available only to pastoral and nomad tribes, who can maintain their flocks and herds by moving continually from one grazing-ground to another according as the conditions of occasional rainfall require.

Population of the Delta ;

Beginning at the north we find a small fishing population occupying many of the villages on the north shore line of the delta and on the lakes and lagoons Mariut, Burolos, Menzala, &c., which lie near the Mediterranean. But almost the whole population of the delta and of the Nile valley up to the Cataracts are agriculturists, tilling their fields and raising two and even three crops annually wherever irrigation and drainage facilities are adequately developed.

of the Arabian and

On either side of the valley of the Lower Nile lie the so-called Arabian and Libyan deserts, in which nomad

tribes alone occur. Except in favoured spots, so inhospitable are these tracts that groups of nomads are few in number, and a considerable proportion of them spend a part of the year at least on the edges of the cultivated lands, hiring out their camels for transporting farm produce and so supporting themselves. On both sides of the Delta, and especially on the eastern boundary, where large tracts of land have been reclaimed of late years by irrigation, many nomads have passed over into sedentary settlers and have practically given up their nomad life. Many more are becoming yearly more closely connected with the fertile lands and find the conditions of life there much easier than in the desert. The same process is in progress to a greater or less extent all along the Nile valley in Egypt, but the steady increase of the agricultural population is working against the accommodation of these pastoral nomads, since the land is all required. On the other hand, the almost complete cessation of transport by camel across the desert makes it harder than ever for these Beduin tribes to maintain themselves. Along the northern portion of the Libyan desert to the west of Alexandria the conditions are easier, for a moderate rainfall enables a semi-nomadic population to subsist, but farther south the desert is almost completely bare of vegetation except in the oases of Baharia, Farafra, Dakhla, and Kharga, where 'islands' of population exist who raise dates and a few cereals on which they subsist. So long as the desert caravan routes were in regular use these oases had a considerable population, but the failure of this source of profit has told upon them.

In the Arabian desert, among the hills which border the Red Sea and the Gulf of Suez, showers of rain are more frequent, and both water and forage are obtainable in small quantities at numerous points; consequently the nomad tribes here are more numerous and better off than those in the Libyan desert. The tribes of the Howeitat and the Maazi Arabs were numerous and fairly prosperous when there was a large carrying trade between the Nile valley and Syria and the ports on the Red Sea,

Libyan
deserts.

Tribes of
the Red
Sea hills.

but in these days it is insignificant, and they have consequently diminished greatly in importance.

Farther south, to the east of the Nile, we find the Ababda, Bisharin and other nomad tribes who are the descendants of the ancient nomad races of this part of Africa and inhabit the main valleys of the complicated hill system which forms the western shore of the Red Sea. These tribes had formerly the monopoly of all transport from Aswan and places in Upper Egypt to the Sudan and profited greatly thereby, but to-day little goes by this route, though there is a certain amount of demand for camel transport at points which are distant from rail and river.

Transport
and tribes
in the
monsoon
region.

From the latitude of Berber southwards we pass into the region of the monsoon rains, and though for a considerable region, practically up to 10° N. lat., the camel is still the most useful means of transport, the facilities for obtaining water and forage are much greater. Tribes therefore are more widely distributed, there are more places at which they can remain for considerable periods, so that at some points their encampments are almost permanent in character. Here there is still a very large amount of transport work to be done, and the varied produce of these lands, gum, hides, &c., is collected and brought in to the principal dépôts and markets by camel transport as has always been the custom. In Kordofan and on its southern borders we pass from the camel, goat, and sheep-owning tribes to the great cattle-owning races, the Shilluks, Dinkas, &c., whose principal wealth consists in their herds of cattle, and who were, until a settled government was established of recent years, constantly raided by the nomad tribes (Baggara, &c.), who ranged over the country to the north of them.

Among these cattle-owning tribes, who inhabit a region receiving ample and even abundant rain in the summer months, permanent villages are common, but as the vast level plains which lie between the different drainage lines soon dry up when the rainy season has terminated, they become in many parts incapable of supporting the herds,

and a regular seasonal emigration takes place from the burnt-up plains to the lower-lying swampy valleys until the early rains of the next summer set in. In these southern parts of the Sudan plains a primitive form of agriculture is extensively carried on round the villages, and supports a moderate population in a well-forested region where there is a sufficient rainfall.

On the whole, from various causes, this part of northern Africa is sparsely populated; only in the delta of the Nile and its valley below the First Cataract at Aswan is the population really dense. Over the desert areas the number of inhabitants is naturally extremely low, and then it increases gradually where more favourable climatic conditions prevail. The Delta, or that area which is known as Lower Egypt, contains 5,105,400 inhabitants, who occupy 4,796,000 feddans of land, besides about 295,000 nomads, thus indicating a density of rather more than one person to a feddan, which is very slightly more than an acre. But this density is very greatly increased in some of the more fertile provinces, such as that of Menufia at the apex of the Delta, where there is a population of 970,581 inhabitants to 373,000 feddans or 608 square miles, thus indicating an average density of almost 1,600 persons to the square mile. This occurs in a province which contains no large town, and of which the whole available area is highly cultivated. The population therefore are densely crowded in the villages, which are closely packed groups of mud-brick buildings, since any expansion or extension trenches on the valuable cultivable land. In Upper Egypt also the provinces of Assiut and Girga show a high population density, as also does the reach between the First and Second Cataract if the population is compared with the cultivated area.

Distribu-
tion of
density of
popula-
tion.¹

Outside the valley inhabitants are practically absent, since only wandering groups of nomads occur until some of the southern valleys of the Red Sea hills are reached, where conditions admit of some semi-permanent encampments. Along the rest of the Nile accurate determinations

¹ Census of Egypt for 1907 has been followed.

of population are not yet available, but since the reconquest of the Sudan and the termination of Dervish rule every cultivable patch of ground along the river in Nubia has its small group of occupants. During the fourteen years of Arab domination whole tribes who were settled on the plains of the Sudan were wiped out and thousands perished by sword, disease, and famine throughout this region, so that only since 1900 has there been any opportunity for a steady increase. Utilizing the Sudan returns for the same year as for Egypt, viz. 1907, the estimated population of the Anglo-Egyptian Sudan, as stated above, was then about 2,000,000, of whom nearly 500,000 were in the province of Kordofan, and nearly the same number were probably inhabiting the southern province of Bahr-el-Ghazal.

Settle-
ment.

The grouping of the settled population is closely determined by the local conditions. The trade ports at Alexandria and Suez occupy natural sites which have long been occupied, while those of Rosetta and Damietta are now of little importance, since river transport along the arms of the Nile is now insignificant, and the bar of silt before each river-mouth prevents the entrance of any but small vessels. Port Said, a new port due entirely to the Suez Canal, has since its connexion with Cairo by railway grown rapidly in importance. Cairo, situated just above the apex of the Delta, has always been of primary importance, and so long as trade passed mainly overland by caravan it was the great mart and dépôt for Eastern trade. It is now rather of administrative importance, and most of the commercial activity is concentrated at Alexandria. In the same way some towns of Upper Egypt and the Sudan had formerly a great importance from their position with reference to the great caravan routes: Assiut on the Darfur road, Kena on that to Kosseir on the western coast of the Red Sea, Luxor on the road to the Sudan, which terminated at Berber, &c.

Of smaller centres of population those in the fertile plains of the Nile valley stand usually in the centre of a group of lands owned by the inhabitants, and in many

cases it can be seen that the town stood originally on a branch of the river which has long been silted up and is now under cultivation. In the Sudan the town sites have usually been determined by the intersection of main trade routes, and special facilities of forage and water; but except Khartoun and Omdurman at the junction of the Blue and White Nile, and Suakin and Port Sudan on the Red Sea, the others are small and of comparatively little importance.

In a warm and dry climate little protection is necessary for shelter from the weather and consequently habitations are of the simplest character. Sun-dried bricks made of river mud are used almost everywhere except in the modern structures of the larger Egyptian towns. Cool, easily constructed and readily repaired, they are well suited to the country and climate, and have not materially altered since early historic times. South of Khartoun, where the summer rains have to be considered, the mud-brick dwelling gives place to the thatched hut of grass, which in one form or another is typical of all the southern part of the Sudan.

Administration

Egypt and the Anglo-Egyptian Sudan are administered under totally different conditions, and much that can be done in the one may be impracticable in the other. Egypt is a province of the Ottoman Empire, and each succeeding Governor is appointed by firman by the Porte. By the Convention of London, 1840, the Sultan undertook to make Muhammad Ali Pasha hereditary ruler of Egypt, and his descendants have held it ever since. In 1867 the title of Khedive was granted and is held by Abbas Helmi Pasha, the present ruler. A Council of Ministers, instituted by a decree of 1878, is the principal administrative body and is formed by the Ministers of the various State Departments. There was also the Legislative Council, a purely consultative body, to which the budget and all the more important legislative measures were submitted; as well as an elected body, the General Assembly, meeting

once in every two years, whose consent was necessary for the imposition of any new 'direct' tax. These two have been replaced by a single Assembly, partly elected and partly nominated.

Provincial
division.

The country is divided into fourteen provinces or mudirias, each under a provincial governor who, with two elected members from each district, constitutes the Provincial Council. These provinces are divided into from five to ten districts (Merkaz), each under an official who is under the orders of the governor of the province, and he is responsible for the administration of the group of villages which form his district. These vary largely in number, and in the area of the lands belonging to them some villages contain several thousand acres of land. In each village is a responsible headman (omda), who has certain powers and to whom the authorities look for all that goes on in the village.

This system is largely the outcome of Muhammad Ali Pasha's reforms in the early years of the nineteenth century.

In virtue of the privileges granted by the Capitulations which have been accorded by the Sultans of Turkey and extended by custom, foreigners resident in Egypt are not subject to Egyptian laws unless the consent of their government has been obtained ; and on the same grounds no tax can be levied on them without the consent of their government.

British
occupations.

In 1882 Britain intervened at the request of the Khedive, Tewfik Pasha, in order to put down a rebellion of the Egyptian army which had overthrown the government of the country and endangered the lives of Europeans resident in the country. The rebellion was suppressed by an expedition sent out from England, and since that time Egypt has been under British occupation. A British military force is maintained at Cairo and Alexandria, and a British Adviser is appointed by the Khedive to the finance ministry on the recommendation of the British Government. Thus the government of the country is carried on in accordance with the general views

of the British Government, though as much latitude as possible is left to the ministers in carrying on the work of administration, but it has been definitely laid down that the wishes of the occupying Power must not be disregarded.

The Capitulations are not, however, valid in the Anglo-Egyptian Sudan, for after its reconquest a treaty between Britain and Egypt, dated January 19, 1899, declared an Anglo-Egyptian condominium over the reconquered provinces, and throughout them the British and Egyptian flags fly side by side. The Sudan is under a governor-general who is appointed by the Khedive on the recommendation of the British Government, and who cannot be removed without the consent of the latter. Besides the greater part of the Egyptian army which is now quartered in the Sudan there is also a British battalion quartered at Khartoum.

After Omdurman had been taken the new town of Khartoum was built on the tongue of land between the Blue and White Nile, where the previous town had stood which the Dervishes had destroyed after its capture in 1884, and this new town of Khartoum is the seat of government, and the capital of the Sudan. The rest of the country is divided into provinces under British governors, and these again are divided into districts in which an official deals with smaller matters and keeps the governor of the province informed of current affairs.

During the last two or three decades much has been done in Egypt to advance the education of the inhabitants. The government now maintains 6 secondary schools, besides an agricultural college, 33 higher primary schools, and 146 elementary schools, besides some technical schools. There are also the professional colleges of law, medicine, and engineering, as well as teachers' colleges. In these about 100,000 students are now being educated, and there are besides about 250,000 children who receive a certain small amount of instruction in the 'Kuttabs' or inferior elementary schools, only some of which are as yet under official inspection. Besides the official activity

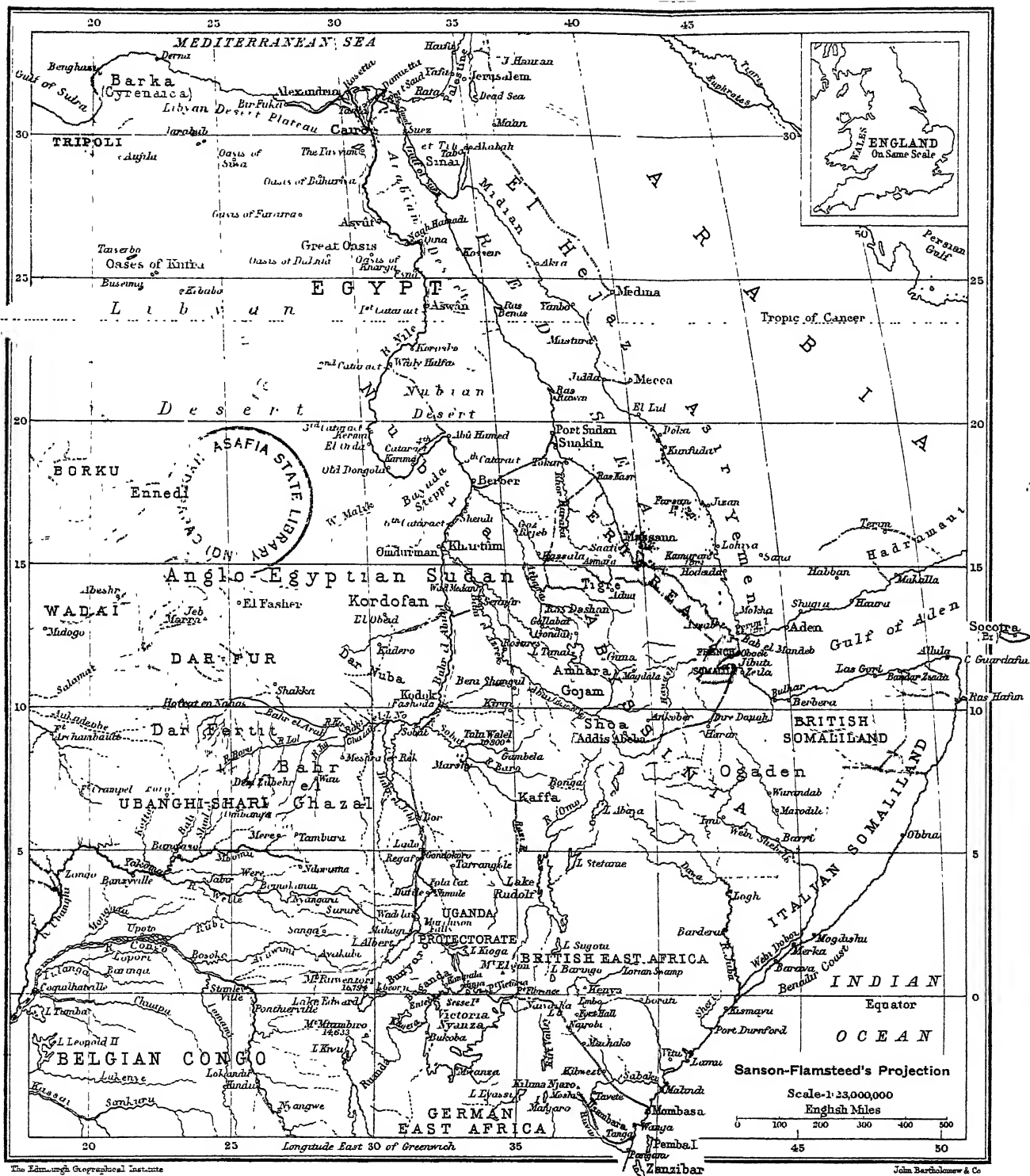
in this direction, a great deal is done by various foreign schools, French, English, American, and others. These have about 55,000 pupils and contribute very materially to the education of the country. There is, however, a great deal still to be done, for at the census of 1907 10,500,000 out of a total population of 11,250,000 could neither read nor write.

General
effects of
geogra-
phical
environ-
ment.

The geographical environment has been such as to make the conditions under which the inhabitants of the northern part of the Nile basin lived exceptionally permanent and regular ; the Nile flood arriving annually furnished the water-supply which, if sometimes more and sometimes less abundant, varied but little on the whole ; a temperature which rendered plant growth possible all the year round if water was procurable ; immigration and invasion were comparatively infrequent, and were such as to effect but little the bulk of the population. Change of religion and change of language connoted little if any change in the character of the people, and this, like their physical form, has on the whole varied extremely little. These peculiarities, evolved under residence among geographical conditions peculiarly constant and strongly marked, must be carefully considered by all who have to deal in any way with the probable effect of that closer contact with the west which has come about of recent years.

Tendency
towards
political
division.

In this narrow valley, whose length is more than sixty times its breadth, and in which the river and the desert margins form the lines of communication, there has always been a strong tendency for the community to split up politically, and to form separate independent small states more or less at variance with those above and below them. All through Egyptian history this feature constantly recurs, and whenever the central power became weak, semi-independent chiefs arose along the valley and in the delta ; from being a powerful and united state the country degenerated into anarchy and confusion until one or another of the local leaders accumulated sufficient power to restore the central control of



the country. Then his first care was to put in order the irrigation system, the communications, and the administration of justice on which the welfare of this populous region depends. The largest of all the desert oases where a fertile soil, a warm climate, and an ample water-supply are present, firm administration alone is necessary in Egypt, in order that a dense population may thrive upon it; and periods of decadence and diminished number of inhabitants have always been the result of enfeebled control and divided authority.

[In addition to works quoted in foot-notes above, reference may be made to the following among recent works: P. Arminjou, 'La Valeur économique du Soudan anglo-égyptien,' in *Revue Econ. Intern.*, 1911, pp. 470-513; Yacoub Pasha Artin, *England in the Sudan*, London, 1911; A. L. Butler, *Notes on the Game Birds of the Sudan*, London, 1912; D. C. E. Comy, *Service and Sport in the Sudan*, London, 1910; Count Gleichen, *The Anglo-Egyptian Sudan*, London, 1906; H. A. MacMichael, *The Tribes of Northern and Central Kordofan*, Cambridge, 1912; C. E. Muriel, *Report on the Forests of the Sudan*, Cairo, 1901; H. L. Tangye, *In the Torrid Sudan*, London, 1910; D. Westermann, *The Shalluk People*, New York, 1912.

A large number of maps embodying results of preliminary surveys in the Anglo-Egyptian Sudan (where this work is practically complete) have been published on the scale of 1 : 250,000. The Survey Department has also made large-scale surveys of the Gezira and of Khartoum and other towns.]

WEST AFRICA

CHAPTER XVI

THE GAMBIA COLONY AND PROTECTORATE

BY MAJOR A. J. N. TREMEARNE

Position
and
extent.

THE Gambia Colony and Protectorate consist of a narrow strip of territory on each side of the lower reach of the Gambia River, together with various small islands situated in the river, the most important now being those of St. Mary and McCarthy, though that of St. James was Britain's first possession (1620) on the coast. The whole forms an irregular triangle, lying entirely between the 13th and 14th parallels of N. latitude, with an area of 3,600 square miles; i.e. about equal to that of the combined counties of Devonshire and Cornwall. The Protectorate takes up most of this area, the size of the Colony proper being only 69 square miles; i.e. equal to the islands of Jersey and Guernsey. The base of the triangle lies across the estuary of the river, some 27 miles wide, while the apex is about 250 miles up stream. Owing to short-sighted policy at the Colonial Office in former days, France has gradually become possessed of more and more territory which was once British, and fear is still expressed that she will some day have the whole.

The capital is Bathurst (7,000) on the island of St. Mary at the mouth of the river, founded in 1816, one of the cleanest towns in West Africa.

Physical
features
and
geology.

Boring operations have revealed the fact that the deepest formation (about 40 feet below sea-level) consists of an extremely fine and highly crystallized siliceous sand, mixed with magnetic crystals and ooze. It is supposed that this is the former ocean and river-bed, the rocks and sedimentary deposits having been laid down upon it gradually, and that after the land had been raised (and the sea had assumed its present level), the estuary and river valley

were eroded anew. The sedimentary deposits were found to be arranged in the order of their specific gravities, and have come from the granitic, dolomitic, and magnesian limestone rocks found *in situ* higher up the valley.

The level of the plateau through which the river Gambia flows is some 60 feet above high-water mark at Cape St. Mary, and it increases gradually, until, at a distance of some 200 miles from the coast, the height is on the average about 150 feet, with many ridges some 25 to 50 feet higher still. The rise from the coast to the interior is gradual and regular, except where there are hills which still have their original crown of laterite, but here and there, near the lower river, the hills are more rounded and worn away.

The present surface of the ridges standing above the plateau is composed of ironstone which now carries but sparse stunted trees, but there are signs that a much more luxurious vegetation flourished formerly, for the rock was covered with a layer of silt and slime, left by the receding ocean, until the heavy tropical rains washed it off. Under the laterite come layers of limonite and haematite, sharp siliceous grit, magnetite, clay and sand, finer clays, magnesian clays (white, yellow, and red), then under the sea-level, magnesian loam and clay with phosphates (white, purple, and violet), and the quicksands mentioned above.

The Gambia is rich in deposits of iron ore, ochres, and china clay, but so far these have not been worked commercially, nor has it yet been thought worth while to extract the gold and silver which are found in minute particles. At one time gold-dust was to be obtained from native traders on the coast (the precious metal being brought, probably, from what is now French territory in the interior), but the abolition of slavery put an end to the caravans, and so to the trade.

The rainy season lasts from June to October, and the country is then so unhealthy that business is practically at a standstill, for on account of the great change from extreme dryness to close, damp, enervating weather,

Mineral
deposits.

Climate.

many of the Europeans proceed on leave. The change is felt more there than in other places on the coast where the climate is more humid throughout the year. In the dry season, however, the climate is better than that of most of the other West African countries lying near to the equator. In Bathurst from November to May there is usually a refreshing breeze. In April—the most pleasant month of the year—a welcome sea-breeze blows. The rainfall varies greatly, the highest recorded being 66·7 inches in 1905; the average is about 51 inches at Bathurst. The mean temperature of Bathurst is about 80° F., but the thermometer sometimes varies as much as 30° in the twenty-four hours. The country farther up the river has an average temperature some 20° higher than that of the coast stations.

Vegetation.

The flora is that of West Africa generally (vide article on 'The Gold Coast'). The mangrove is common, the mahogany and rosewood (*Pterocarpus crinaceus*) are found, and the rubber-vine exists, though it is scarce. There are many varieties of fern, and the indigo plant is useful commercially. The fauna includes the elephant (only a few now, and only in the eastern portion of the Protectorate), the camel, giraffe (extremely scarce), hippopotamus, Senegambian buffalo (scarce, and protected by law), lion (very scarce), leopard (common), hyena (striped and spotted varieties), antelope (twelve species: West African or Darbian eland, roan, water-buck or sing-sing, West African and Korrigum hartebeestes, West African situtunga, Cobus or Bufrons Kob, Nagor reedbuck, harness antelope or lesser bushbuck, Gambian oribi, crowned duiker and redflanked duiker), the serval, African lynx or caracal (rare), civet-cat, wart-hog (*Phacochoerus africanus*), hunting dog (*Lycaon pictus*), jackal, ant-bear, porcupine, hare, squirrel, weasel, horse (though not much used), donkey, goat, dog, pig, cat, and rat and mouse, and several kinds of monkey, the commonest being the dog-faced baboon. The baboon is the bane of the ground-nut planter, and large numbers of dogs are trained to watch the farms and assist in organized drives. There

Animals.

is a large number of cattle, in many places greater than the land can properly support. They are not bred for profit, but are kept simply as a display of wealth. Of reptiles, there are the crocodile, iguana, lizard (several varieties), snake (several), tortoise, and turtle.

The list of fish includes the shad, barbel, barracouta, Fishes. bream, cod, eel, gar, grouper, mackerel, mullet, snapper, sole, trout, and tunny. But owing to the quantity of food in the river, the fish will not touch artificial bait, so sport is not good. Sharks, crabs, sword-fish, porpoises, and rays are also found. Quantities of oysters are obtained in Oyster Creek and are cooked by the natives for food, the shells being made into lime.

There are many different kinds of birds, the principal Birds. being duck, goose, plover, 'bush-turkey' (bustard), 'bush-fowl' (francolin), guinea-fowl (gallini), quail, sand-grouse, crow, weaver, fire-finch, shrike (several varieties), swallow, night-jar, hornbill (several), kingfisher, cuckoo, pigeon (several), parrot (several), eagle, vulture, hawk, egret, ibis, stork, crane, ostrich, wood-pecker, owl, heron, bittern, marabout, pelican, cormorant, and, of course, the domestic fowl.

Among insects, &c., are the ant (several varieties), bee, Insects, &c. butterfly, centipede, scorpion, spider, hornet, mosquito, fly (several varieties, including the tsetse), locust, grass-hopper, tape-worm, guinea-worm, and others.

At the present time the great majority of the native male population is engaged for about eight months of the year in the cultivation of the ground-nut, which is valuable commercially on account of its oil. This article was introduced into the country about the beginning of the last century by ex-slaves from America, but it was not until 1832 that much attention was paid to the industry commercially. In 1860 the export amounted to 10,000 tons, and it has now grown to five times as much, but it is estimated that one-third comes from French territory. Thousands of foreigners arrive each June to assist in the planting, which takes place immediately after the early rains have fallen, and they are

Agriculture, &c., mining, and manufactures.

given farms to work, being housed and fed by the landlords. When the crops have been reaped, these tenant farmers hand over one-half of the produce to the owners of the farms, sell their own share, and leave the country again.

The government's policy of issuing seed-nuts to the people, thus introducing fresh seed, and ensuring an interchange of seed from one district to another, has been very successful.

Land in the Protectorate can be obtained for agricultural purposes for 21 years on payment of 2*d.* per acre per annum, but the government has really done but little to develop the resources. There are no mines. The cultivation of the ground-nut is the only important industry in the colony, and there are practically no manufactures, with the exception of the weaving of native-grown cotton into pagns ('country-cloths'), the preparation of vegetable oils, boat-building, and the making of bags, sandals, &c., from locally tanned leather and dyed grass.

The rates of wages in Bathurst are high, and labour is scarce. Throughout the Protectorate the people are happy, and their wants are not great; their prosperity is evidenced by the ever-advancing revenue returns.

Transportation.

The River Gambia is navigable for ocean-going steamers of moderate draught up to McCarthy's Island, and boats drawing no more than six feet can go for a considerable distance beyond that point. The width at the estuary is 27 miles, and there is 26 feet of water over the bar at low tide, while at the Kai Hai the channel is being deepened so as to allow of the passage of steamers drawing up to 16 feet. There are numbers of sailing-boats on the river. A government steamer maintains a regular weekly service between Bathurst and McCarthy's Island, carrying passengers at 2*d.* and 1*d.* per mile, and letters at 1*d.* each. There are no internal telegraphs, but most of the Government Departments are connected by telephone. The charge for cables (by the African Direct Telegraph Company) to the United Kingdom is 3*s.* 6*d.* per

word. There is no direct parcel post to foreign countries, so all European parcels must be sent through the London office.

There are no railways. Overland travelling is accomplished by Europeans on horseback or in hammocks, but there are no metalled roads. The colony suffers through being situated off the beaten track of the principal steamers (which proceed from England direct to Sierra Leone), but smaller boats of the Elder Dempster Line call once a fortnight, and vessels belonging to French, German, Danish, and other British companies pay irregular visits.

The principal products are ground-nuts, hides, beeswax, Trade. rice, cotton, maize, corn, palm-kernels, cassava, rubber, wax, indigo, a species of jute fibre, and country-cloths. Of the exports, about three-quarters go to France, but more than one-half of the imports come from Great Britain. A considerable entrepôt trade is done with the French settlements and the adjoining coast districts in cotton goods, spirits, tobacco, rice, kola-nuts, and hardware. Both export and import trade were declining until 1906, when an improvement took place, and this has been maintained.

Sites for trading stations, or 'factories', as they are called, are granted by the government at a rental of 1s. per 100 square yards, the minimum payment allowed being £3 per annum.

The population of the Colony and Protectorate is about 146,000, of which some 180 are Europeans, mostly officials or traders. The chief peoples forming the native population are Jollofs (or Woloffs), Mandingos, Serers, and Jolas. The first-named are the superior race, and in Bathurst they constitute the bulk of the non-Christian population. They are noted for their powers of conversation, and for their extremely black colour, and, as they are good traders, their language is widely spread in Senegal and Guinea. They are a handsome, fine-featured people, and have now embraced Islam, though it is thought (from the shape of the ancient graves) that at

Popula-
tion.

one time they were sun-worshippers. The Mandingos are the representatives of the once powerful Melli, and have a somewhat Mongolian type of face. They were the first to become Muhammadans. The Serers are still pagans as a rule. The Jolas, the direct descendants of the Floops, retain the primitive form of communal government in their own country, each patriarch with his family and dependents occupying and defending a walled and stockaded village, and owning no allegiance to a tribal chief; but combining against a common enemy. Independent families of the great Fula race are to be found wandering through the country with their flocks and herds, but they hardly form an important part of the population at the present day. From time immemorial the Mandingos and the pure Fulani have dwelt in amity, the former protecting the latter, who looked after the cultivation and the breeding of cattle.

Govern-
ment.

The country under British rule is divided into the Colony—consisting of the island of St. Mary, British Kombo, Albreda, the Ceded Mile, and McCarthy Island—and the Protectorate, but for practical purposes the whole, excepting only St. Mary's Island, is treated as a Protectorate. The Colony is governed by the governor with an executive and a legislative council, the Protectorate is ruled by commissioners (responsible direct to the governor) through the native chiefs. There are two municipal boards, the Board of Health and the McCarthy Square Board, each being composed of official and non-official members.

An English company traded to the Gambia in 1618. In 1783 and 1857 the trading rights of the French then there were exchanged for those of Britain in Senegal, and the Gambia was formally recognized as a British river. Until 1807, the settlement was an important centre of the slave trade, and furnished annually many thousands of human beasts of burden for America and the West Indies. From 1807 until 1843, and from 1866 to 1888, the settlement was under the government of Sierra Leone, but in the last-named year it was finally made a separate



PLATE XXI (a). GOVERNMENT HOUSE, MCCARTHY ISLAND, GAMBIA



PLATE XXI (b). FACTORY ON THE UPPER GAMBIA



PLATE XXII. SHERBRO, SIERRA LEONE (NATIVES
EXTRACTING PALM OIL)
(Mr. T. J. Alldridge)

possession. The Protectorate was established in 1894, and added to in 1901 and 1902, but it was diminished again in 1904, when about 30 miles of the river at the eastern end of the country was handed over to France.

A company of the 'Waffs' (West African Frontier Force) and a volunteer battery, the members being mostly government clerks, are stationed at Bathurst, and also a small police force.

There is no public debt. There is a Government Savings Bank in Bathurst under the treasurer of the Colony, and a branch of the Bank of British West Africa. The legal tender, and usual currency, is that of the Latin Union, but a number of French five-franc pieces are in circulation. There is no colonial coinage or note issue, but Bank of England notes are accepted by the Bank of British West Africa.

Schools are maintained by the various denominations, assisted by grants-in-aid from the government, the amount of the assistance being based upon the average attendance of pupils, and upon the results of examinations conducted by the Government Inspector of Schools. An agricultural school is managed by Roman Catholics at Abruko, and there is a Wesleyan High School which imparts secondary education. The Muhammadan School at Bathurst is managed by a Board of leading Muhammadans with the Governor as chairman. The government pays the salaries of the teachers at this school and of the superintendents of the other schools. There are more than forty native friendly societies in Bathurst. In the Protectorate, prizes are awarded to the cleanest village in each province.

See *The Colonial Office List* (Annual); *The Annual Report. The Gambia*, Biblio. by H. E. Reeve (1912). *The Niger and the West Sudan*, by A. J. N. Tre- graphy. mearne (1910). *The Encyclopaedia Britannica*, s.v. Major Cowie's map (1904-5), 1 : 250,000.

CHAPTER XVII

SIERRA LEONE

CROWN COLONY AND PROTECTORATE

By T. J. ALLDRIDGE

Position
and
extent.

SIERRA LEONE proper, with the Protectorate, is situated on the west coast of Africa between $6^{\circ} 55'$ and 10° N. lat. and between $10^{\circ} 40'$ and $13^{\circ} 21'$ W. long. Its coast-line from Kiragba, by the Great Scarcies River to the Mano River, is 210 miles in length. It is bounded on the north and north-east by the French possession, Guinée Française, and on the south-east by the negro republic of Liberia. The estimated area is for the Colony proper 4,000, and for the whole territory 25,000 square miles.

Deriva-
tion of
name.

The derivation of the name Sierra Leone, or Lion Mountain, is uncertain. Its mountainous outline, seen from the sea, bears no resemblance to the king of beasts, although the tropical thunder heard as the storm rolls over the heights may possibly have suggested to certain imaginative persons the roaring of a gigantic lion.

Physical
features.

Approaching Freetown, the capital, from the Atlantic, the traveller's attention is attracted by the beauty of the mountains, covered with luxuriant vegetation, rising in most places by undulating slopes practically from the water's edge to densely wooded ranges with lofty peaks, the highest of which are the 'Sugar-loaf' (2,496 feet), Leicester Peak (1,954 feet), Mount Auriol, and Kortright Hill.

The whole of Sierra Leone may be described as more or less mountainous. There is rarely any extensive view that is not bounded by at least a hilly horizon. The mountains naturally form great catchment areas, consequently rivers are numerous.

Cape Sierra Leone, on which stands the lighthouse, at the point of what is known as the Sierra Leone Peninsula, is about six miles from Freetown. Here vessels bound

for Freetown turn towards the broad estuary of the Sierra Leone, or more properly, the Rokel river. This estuary forms a splendid harbour, the finest, indeed, in West Africa, with a wide open roadstead, which is about seven miles from Freetown to the opposite Bulloom shore, and much wider from the lighthouse. Even before landing in the colony its two most marked natural features command attention—the mountains and the water-way.

No exhaustive geological survey seems as yet to have Geology. been made of the whole country. There is, however, a concise description of such of its geological features as were observed by G. A. Scott-Elliot, M.A., F.L.S., to be found in his report on the country traversed by the Anglo-French Boundary Commission; Professor Scott-Elliot having, as botanist, accompanied the Commission in 1892. The following extracts are from his official report :

‘The country seems to be everywhere underlaid by a gneissose or granitoid rock, which varies greatly in appearance from that of a very coarse red or grey granite to a distinctly foliated gneiss. This rock appears on the sea-coast at Sierra Leone, and it also forms the tops of most of the higher plateaux which we saw; thus the Sugar-loaf at Sierra Leone consists of a rock of this nature, and it also forms the immensely broad watershed crossed between Falaba and Farana which separates the Scarcies, Rokel, and Niger drainage areas. This rock, though extremely common and apparently fundamental everywhere, is not often, at least in the lower districts, seen on the surface. Almost the whole of the country lying between the sea-level and 2,000 feet, is covered by varieties of a reddish laterite or ironpan, sometimes exceedingly hard and barren, but usually porous, easily worked, and apparently of a very fertile nature. There is also a very well-marked dolerite or basalt flow in the north-west corner of the English sphere of influence, traces of which were found at places on the Scarcies River, and which forms a very marked dyke 20 to 30 miles long, on the summit of the hills about Ninia and Duunia in the Talla country. In the immediate neighbourhood of this flow there are some hardened slates or argillites, and the country is especially fertile where fragments of this dolerite are mingled with gneiss and sandstone.

'The dolerite itself is used by the natives as hones for sharpening knives, &c.

Iron.

'The only mineral of importance is iron, of which the country appears to contain a very large amount.

'There is a peculiarly rich belt of titaniferous iron ore in the hills behind Sierra Leone.

'In other respects the country seems destitute of mineral wealth, though, of course,' Mr. Scott-Elliott adds, 'not being a geologist, I cannot speak with any certainty.'

Classes
of soil.

'The soil, so far as we saw, could be roughly grouped into three classes:

'First. That of the plateaux and hills about 2,000 feet, or sometimes descending to 1,000 feet, which is due to the disintegration of gneiss or granite rocks.

'Second. The red laterite which covers almost invariably all the lower hills from the sea-level to 1,000 or 2,000 feet.

'Third. The alluvium due either to the action of the mangrove along the coast, or to rivers and streams inland.

'The effect of the mangroves could be very clearly seen. The trees seem, in fact, to have been designed by nature to change any bay or indentation of the coast-line into fertile soil. Thus the whole of the country from Mahala to Rokon, and round from Digipali to Kitchom seems to have been at one time a wide bay or arm of the sea, in which sand and mud banks accumulated through the action of the tides and currents.

'Wherever such a mudbank is in process of formation, the mangroves grow upon it. They require brackish water. The trunk divides at the base into six or seven curved buttress-like roots; each of which subdivides repeatedly so that it covers a wide area, with curved grasping supports. This is, however, but the first stage of growth; after a very short time long hanging roots are sent down vertically from every branch of the tree, and about the level of high tide, each of these pendant roots divides into five or six grasping fingers, which grow down into the water and root themselves so firmly in the silt that they cannot be torn up by any ordinary force of current.

'As each branch of every mangrove acts in this way, the soil becomes pierced by roots in every direction, so much so, that where the natives have made a clearance for rice-growing, the numerous standing roots in the ground seem like a harrow with the points turned upwards. Hence the leaves of the mangroves and all the silt and soil

in the water, are held by this meshwork of roots and root-lets, and the accumulation of soil advances rapidly. As the level of the ground (through this accumulation) rises above high tide, the mangroves, which require a constant supply of brackish water, die off and the whole grove advances seaward, leaving behind it a mass of rich vegetable alluvial mud, better suited for rice than probably any soil in existence.'

The climate is tropical. There are two seasons, the Climate. wet and the dry; the former begins towards the middle of May, lasting till November, with many short intervening spells of fine weather. Indications of the approaching and terminating rains are given by tornadoes. During the year 1910 the greatest variation in the barometer was 0.361 inch, the highest reading being 29.980 inches in May and the lowest 29.619 in July. The highest monthly mean temperatures were 90.7° F. in February, 91.4° in March, 92.2° in April, 90.2° in May; the lowest were 71.2° in January, 71.7° in July, 71.7° in August, 72.1° in September, and 71.8° in October. The minimum humidity was reached in January, when it registered 55. The total rainfall in Freetown was 133.44 inches. The greatest rainfall was in July, when it rained every day, 43.24 inches, 4.99 inches falling in one day. During the year rain fell in Freetown on 170 days.

The climate has been considered deadly to Europeans; Climate but great attention has been directed of recent years to and health. the causes of its unhealthiness, with excellent results. The following facts have been established

(1) That the low-lying coast and the mouths of rivers where the mangrove flourishes are exceedingly malarious.

(2) That malarial and yellow fevers are due to the bite of the *Anopheles* and *Stegomyia fasciata* mosquito when in an infected state, and that the mangrove swamps and insanitary towns are the chief breeding-places of these mosquitoes.

(3) That as the coast is left the high ground of the hinterland is found to be healthy, and, to those who can stand the heat, agreeable.

(4) That much of the unhealthiness of Freetown is due

to causes that are, it is true, preventable, but can only be overcome by incessant warfare with the conditions of an intensely congested native town. How to enforce sanitary regulations in the native compound is a very grave problem.

The railway into the healthy interior is proving of immense service, as is also the mountain railway from Freetown to the government bungalows on Wilberforce Hill, only 6 miles from the city, at an elevation of some 900 feet ; where free from mosquitoes the officials who reside there have quiet and undisturbed nights in an invigorating atmosphere absolutely different from that of Freetown. We may conclude, then, that the climate largely depends upon elevation, and on distance from the breeding-grounds of the mosquito. The application of scientific knowledge is steadily modifying the worst features of the climate and gradually lessening the load of opprobrium under which Sierra Leone has hitherto suffered. The work that the London and Liverpool Schools of Tropical Medicine have done, and are doing, is invaluable in this direction.

Hydro-
graphy.

The whole country is exceptionally well watered. Even in the dries a water famine is unknown. There are numerous excellent rivers and water-ways, but although, in many instances, they run great distances through the country, their usefulness for inland transport is lessened by the blocking of their channels at 20 to 40 miles from the sea. In the upper country some of the interior rivers, such as the Bafi, are found to be blocked by a mass of enormous boulders with not a trace of water showing.

The principal river is the Rokel, on the magnificent estuary of which Freetown is situated. A branch of the Rokel leads up to Port Lokko about 50 miles from Freetown, the chief starting-point for the Karene and Falaba areas. South of Freetown are the Ribbi, navigable for small craft up to Mafengbeh ; the Bompeh, navigable to Rotifunk, both running into Yawry Bay ; and the Bagru, navigable to Tasso (about 30 miles). The mouth of the

Bagru is opposite to Sherbro Island. The rivers most important to trade are in the Sherbro district, either behind the island itself or at the back of the narrow sand-spit known as Turner's Peninsula. Between this peninsula and the mainland runs a great water-way parallel with the sea. It is navigable all the year round, and is the most valuable trade water-way in the whole colony. It is called the Bum (pronounced Boom) Kittam up to its confluence with the broad Big Boom, when it becomes the Lower Kittam, a continuation of which, after passing the bar-mouth of the Upper Kittam River, leads into the magnificent Kase Lake.

During the rains the interior rivers are greatly swollen and navigation is possible for much longer distances than in the dry seasons; large quantities of native produce are brought down, and the banks of the rivers, behind Turner's Peninsula and Sherbro Island, present a very busy scene.

The Kase, about 7 miles wide and 15 miles long, and the Mabesse, a smaller lake about 10 miles inland from Kase, are the only noteworthy lakes in the Protectorate. Beyond Turner's Peninsula is the Sulima or Moa River, and five miles further on is the Mano, running between British territory and Liberia. At the mouths of these two rivers are two bad sea-bars that are continually shifting and can only be passed in good weather, during the dry seasons, by means of surf-boats manned by experienced natives from the Kru country. The banks of all rivers, as long as the water remains brackish, are lined by forests of tall mangrove trees. The rivers are generally only navigable for small craft. The Sherbro River, however, is navigable for ocean steamers up to York Town on York Island, about 25 miles.

Vegetation is profuse in the extreme, but one indigenous tree is of such incalculable importance that every other form of vegetation hardly counts in comparison. Sierra Leone is pre-eminently the domain of the oil-palm (*Elaeis guineensis*). This tree reigns here in unchallenged supremacy. The whole life of the country and its value

Vegeta-
tion.

to the world at large depend on this most beneficent sovereign. Springing untended from the ground, asking nothing from human hands, it gives of its substance without stint and with unfailing regularity, supplying the native with the simple necessities of daily life, as well as his work and trade. Up-country and on the coast the oil-palm flourishes in the greatest luxuriance. It is a source of indigenous wealth that has indeed hardly yet been more than gently tapped. In the far interior it grows in thick forest-belts, many of which are practically untouched.

Next in value is the kola. This tree grows to a great size with wide-spreading branches. It is indigenous but is cultivated to great advantage, and is a source of considerable profit to the natives. Its dark greenish pod may contain up to a dozen nuts, which have a very bitter taste. The people not only use them at country ceremonies, but consume them as preventives against thirst, &c. The nuts are entirely a native food, and trade in them forms a gigantic industry, enormous quantities being exported yearly to the Gambia and Senegal ports, these nuts taking second place in the exportations from Sierra Leone, though a very small quantity is shipped to Europe.

The cane palm (*Rafia vinifera*) grows in abundance for mile after mile on the banks of the rivers. It provides palm wine, also a bass fibre known on the European markets as piassava, chiefly used for scavengers' brooms. Coco-nut palms are to be found everywhere near the seaboard and yield prolific crops, at present only consumed locally. Fan palms, locust and gum trees, are plentiful in certain places, and amongst the numerous fruit-bearing trees may be mentioned the mango, pawpaw, orange, lime, sour-sop, sweet-sop, bread-fruit, kashew, tamarind, guava, &c. Bananas grow everywhere, and pine-apples form a dado to many of the bush paths in Mendiland. The silk cotton trees, from which the fluffy vegetable down ('kapok') is obtained, are common, and from their great height and enormous top serve as useful landmarks, their tall and mighty buttresses radiating from the trunks and losing themselves in the dense undergrowth. It was

from these immense spurs that solid slabs were hewn to form the gates to the war stockades in earlier times.

In 1910 a forestry officer was appointed to organize Forestry. a forestry department. During that year an inspection was made of the various forests in the Colony and Protectorate. It was found that the forests of the country divide themselves naturally into rain forests, where the trees reach 100 feet and over, and savana forests or open woodlands. Ninety-nine per cent. of the rain forests in the Protectorate have been destroyed by the natives through their wasteful methods of farming. At one time the rain forests must have covered the whole country; they are now confined to certain limited areas. The destruction of the forests is gradually lessening the rainfall, and consequently altering the climate of Sierra Leone.

Sierra Leone is hardly suited to big-game hunting in Animal
life. the ordinary acceptance of the term, the larger animals being comparatively scarce. A game licence costing £25 is required. Numbers of animals inhabit the forests and bush, but few are seen; they seem to shun the invader. The dense mangroves are the home of countless grey monkeys. There are neither lions nor tigers, but the following are to be found: elephants, hippopotami, leopards, and tiger cats, bush cows, wild boars, chimpanzees, monkeys of different kinds, armadillos, porcupines, &c. Crocodiles of great size infest the rivers. Pythons and snakes of many varieties, poisonous and non-poisonous, are found. Birds include white egrets and numerous kinds of cranes; pelicans, grey parrots, spur-winged geese, &c. Fish abound in the sea and in the rivers in great variety, amongst them being tarpon of enormous size and manatee. Excellent oysters mature on the lower limbs of the mangroves in vast quantities.

Amongst the numerous insects are butterflies of gorgeous colouring and markings in endless variety; scorpions, tarantulas, centipedes, mangrove flies, hornets, praying mantis, armies of ants and most destructive termites, jiggers, enormous cockroaches, mosquitoes, and sand-flies innumerable.

Agriculture.

The soil is extremely fertile and is easily worked. All agriculture is termed by the country people 'farming'. The methods they adopt are of the most primitive kind. To clear a space in the bush for cultivation for cassada, usually the first crop, the bush, which is a tangle of all kinds of vegetation, is hacked down with matchets, but the young oil-palms which are generally met with are left to mature after being carefully trimmed. The cuttings are then burned, but the fire while scorching the stems and fronds of the palms does not vitally injure them; this burning is called 'brushing farm'. The surface is scraped by a narrow hoe and the ground is then planted. In a few days the crop appears. Little more attention is needed, until, as in the case of rice, bird-driving time arrives, when a high rough platform is erected here and there on the rice-fields, upon which a child sits and scares off the birds with sling and stone.

Food-crops, &c.

The principal articles of food are rice and cassada, which are grown all over the country. Rice can be grown in damp alluvial soil by the side of the rivers within reach of the tide. This is white 'American rice', and has to be transplanted. It is an early crop, useful until the heavy dry-land crops of many varieties are available. In the upper country cotton seed and guinea-corn seed are usually sown with the rice. Maize, cuscus, and benni seed also grow well, but are not largely cultivated, although they might be. Ground-nuts used to be one of the leading exports of Sierra Leone; some years ago prices went down so low that the industry entirely dropped; but so great is the present demand, with increasing price, for vegetable oils, that there are indications of its revival. Ground-nuts are one of the simplest crops to raise.

Rubber.

The rubber vine (*Landolphia owariensis*) that formerly swooped down from the tall forest trees, has been destroyed in the ordinary course of making farms. The government within recent years introduced Para rubber seeds. The seedlings planted out at Kennema were apparently thriving at the date of the last official report, some of them reaching a height of from 10 to 15 feet.

So far cacao has not been taken up by the natives, Cacao. although it has been tried, here and there, with moderate success, but as there is now an Agricultural Department, better methods of cultivation will probably follow for cacao, and for other crops requiring more technical knowledge. As a whole, no fault can be found with the soil as a crop-producer; but to make it yield its full results, more knowledge and more scientific treatment are required.

No mining is carried on either in the Colony or in the Protectorate. Excavations for plumbago have been made in the Bagru locality, Sherbro; but it was shown that although this mineral was there, it was in such small pieces as to be unprofitable to work, so nothing has resulted from the discovery. Minerals
and manu-
factures.

The few native manufactures that until recently were practised in Sierra Leone are rapidly disappearing; destroyed either by the now easily obtained imported articles, or by the phenomenal prices paid for oil-palm products, which make the people disinclined to work less profitable industries. A few 'country cloths' are still woven on primitive looms in very narrow strips, and then sewn together to form cloths of considerable size. The cotton used was formerly all of native growth, but now much imported yarn of brilliant and fugitive colours has been introduced. The women spin the cotton and dye it in the village indigo pot, of which they are the custodians. Until the recent changes this was a great industry, as these cloths were the principal currency. Many were of artistic merit, but they are now difficult to obtain.

Iron-stone is found everywhere throughout Sierra Leone. The natives in the upper country smelt it and extract splendid iron from it. When smelted the iron is made up into a shape somewhat resembling a small T-square, twisted and brought to a 'fish-tail' end, the value of one such piece being equivalent to a penny. In Upper Mendi 200 pieces would formerly purchase a wife. All swords, spears, knives, hoes, and other implements are made by the native blacksmiths, with the aid of sheepskin Iron-
working.

bellows and country-burnt charcoal, of this iron, which is extremely malleable and retains a silvery brightness. It is not exported; on the contrary, iron bars, rods, &c., are imported for trade purposes.

Pottery. A rude kind of pottery, mostly water-beakers and bowls, is made by the women in different parts of the country, from a greyish-coloured clay. Mat-making and bamboo-thatching from the leaflets of the *Rafia vinifera* or bamboo palm, also constitute a considerable industry. Some very excellent leather work is made in Freetown from country skins locally tanned with the bark of the mangroves.

Communications. The railway described below has effected a complete revolution in the districts within its sphere. Great tracts of country, however, are quite beyond its influence, and in them the native methods of transport are still what they have always been. Produce is packed into palm-leaf hampers and carried upon the heads or backs of men to the branch factories of the European firms or the Creole (Sierra Leonean) traders established along the railway, or at the head of navigation on the rivers, and either conveyed by the railway to Freetown or put on board small craft and water-borne to the coast, most frequently to the port of Sherbro, where useful water-ways are available, and whence it can be shipped to Europe by ocean steamers. The limit of this human transport is about 50 miles; beyond that distance produce is rarely collected by this method to any appreciable extent.

In 1909, the government, as an experiment, imported twenty-four donkeys from the Gambia with a view to adopting them for transport purposes in Sierra Leone. They were taken to Port Lokko in the Karenc District, and after only five and a half months eighteen had died, twelve succumbing to the tsetse fly. The experiment has therefore been discontinued. Horses cannot live for any time in the colony, except far up country.

Railways. In 1896 the government began to construct the first railway in West Africa, running from Water Street, Freetown, to Baiima, 220 miles in an easterly direction.

This railway has been extended by tram-line (a distinction without a difference) to Pendembu in Bambara, Upper Mendi country, and has 34 stations. At Boia Junction, 64 miles from the terminus at Freetown, a branch tram-line has been opened to Mafunkia, 22 miles to the north-east, which has proved so successful that it is now being rapidly pushed on through Yonni Banna, a further 16 miles, and thence through the Timne land by Makump and on to Rowalla, in the neighbourhood of the Rokel River; in all, about 84 miles from Boia, and 148 from Freetown. This railway and its branches penetrate the heart of prolific oil-palm areas, and some very fertile agricultural land. The changes that have been wrought by the introduction of this railway are extraordinary. It has proved of inestimable benefit to the people, and in regard to commerce, some idea may be formed of its economic importance by a comparison of the exportations of palm-oil and palm-kernels before and after its advent. In 1896 the shipments were for palm-oil 326,089 gallons, and palm-kernels 21,084 tons. For the year 1910 they amounted to 645,339 gallons and 43,031 tons respectively, the greater portion, before the opening of the railway, coming from the Sherbro.

In Freetown there is the Government Mountain Railway which runs to the cantonment of the West African Regiment, and on to Hill Station at Wilberforce, 900 feet above sea-level, where are situated the government bungalows for European officials. The whole distance is 6 miles, through enchanting scenery, occupying 30 minutes, and, as stated elsewhere, the benefit to health is incalculable.

In connexion with the railway are numerous govern- Roads, ment roads to facilitate the overland carriage to the stations. It is now no uncommon sight to see both Europeans and Creoles bicycling over these roads, and it is not too much to anticipate that motor traffic will speedily follow, as these feeder-roads are good. Away from the railway, overland carrying is still upon the heads or backs of the natives, a load being of 50 lb. weight

if for the government, or double that if for a chief. Much has been done in developing the country traversed by, or in proximity to the railway, but it must be remembered that enormous areas of unworked country, owing to want of transport, are still in their primeval condition, and must remain so until they are provided with modern means of locomotion. How greatly the railway is appreciated may be seen from the fact that in 1910 the number of passengers carried was about 350,000, together with over 53,000 tons of goods, producing a revenue of more than £100,000. The railway has enabled a great number of Sierra Leoneans to leave the congested Freetown and open up profitable trading along its route in the healthy hinterland.

Trade. Trade in Sierra Leone is in a state of transition. The old barter system has passed away and payment in cash has taken its place. The railway affords great facilities for the transport of produce, but the actual preparation of produce is still carried on by the old slow and wasteful methods.

Production and export. Produce, alike by the native and the European merchants, is classed simply as palm-oil and palm-kernels. There are other articles, but palm-oil and palm-kernels, like the oil-palm itself, reign supreme. Trade is good or bad as these two staple commodities find their way to the coast in larger or smaller quantities. Palm-oil is still expressed from the fibrous oleaginous pericarp of the fresh palm fruit in the most primitive way ; after which it is sent down in large casks to the coast and shipped as oil. Palm-kernels are the kernels of the inner nut of the same fruit. To obtain them the hard shell of every nut is broken by hand, a most tedious operation. The breaking of one bushel of nuts is a good day's work for an experienced person, and only provides a quarter of a bushel of kernels. These kernels are shipped as kernels to Europe, where they are treated, and produce a whitish-grey oil of thinner consistency than the palm-oil of commerce.

Vegetable fats are imperatively required in many of

the greatest European industries. This has caused very high prices to be paid to the natives of West Africa, who are alive to the value of the harvests they are reaping, and consequently desert other employment for that of dealing with the oil-palm cone. Slow as the native methods are, the railway finds considerable difficulty in coping with the enormous quantities of these two staple articles waiting to be carried down to Freetown for shipment. What dimensions the trade would reach if the vast oil-palm belts lying far beyond the influence of the iron road and practically untouched, because transport to the coast is not to be had, were worked by scientific machinery, it is impossible to imagine. Certainly in the scientific treatment of this immense indigenous wealth lies, in the near future, the economic development of the Sierra Leone Colony and its Protectorate.

The kola-nut trade is growing year by year, but has no direct influence upon the European produce markets, the nuts being almost entirely used by the natives at one place or another upon the coast. It causes, however, a great interchange of imported goods.

Freetown itself produces nothing. It is a distributing centre; its people are born traders, and the up-country natives are rapidly becoming just as eager to follow their example.

Imports are of the most varied kinds, but are mainly Imports. Manchester cottons, American leaf tobacco, kerosene oil (the chief illuminant), enamel ware, and gin and rum. These last, under the heading of spirits, bring in about half the Customs revenue. The whole country within reasonable carrying distance of the railway is covered by itinerating traders, while trading simbeks (or shanties) spring up like mushrooms near every station.

The population may be roughly classed under three heads—natives, Sierra Leoneans, and Europeans. The natives number well over a million and a quarter. The term 'Sierra Leoneans' is exclusively applied to the descendants of the original settlers and 'liberated Africans' who were rescued from slave-ships captured by Popula-
tion.

British cruisers, and settled at Freetown when Sierra Leone became a British Colony. The European residents, including colonial government officials, military officers and men, and the commercial community, number about 640.

Speaking generally, both Sierra Leoneans (often called Creoles) and natives are capable of considerable intellectual development. Many of the former have been well educated in Europe ; some have qualified for the Church, while others occupy high local positions in the legal and medical professions. Considering that much of the hinterland, only some 20 years ago, was entirely at the mercy of the chiefs, who were continually at war, it is remarkable that its people now show a more than ordinary aptitude for receiving information. There are many schools, mostly connected with missions, in and about Freetown, and in the nearer up-country districts. At Bo there is a large government school for the sons and nominees of chiefs, which seems likely to carry practical knowledge, not only of reading and writing, but of farming, carpentry, &c., into the far interior, the boys there taking a very keen interest in their studies, and proving capable of culture. The girls in the mission schools are also bright and intelligent. The belief in 'fetish', however, still keeps the African in a slavery from which it is most difficult to escape.

Ethnology. There are about fifteen native tribes, offering striking differences in their physique, languages, and general characteristics. The largest tribe are the Mendis, on the eastern side, occupying a very wide tract of country, known as Upper and Lower Mendi. They are pure negroes, of medium stature, well grown, and of great endurance. They are the principal overland carriers, equal to carrying heavy loads over long distances. They are also the best hammock-men, and are capable of profiting by education. They are extremely superstitious, and firm believers in all kinds of fetishes and 'country medicine'. They are for the most part pagans or moderate Muhammadans, but by no means abstainers.

The Timnes are the next most numerous tribe, and are physically and intellectually much the same. They are principally Muhammadans, and have been chiefly engaged in agriculture; they also make good canoe-men and petty traders.

The Mandingos are an exceptionally fine race, tall and of striking appearance, distinguishable even from a distance by their flowing robes and sandals. They are devout followers of the Prophet and strict abstainers. They are the principal purveyors of Arabic phylacteries and written fetishes, and are the recognized soothsayers everywhere in Mendiland, being known as 'Mori' or book-men.

The Sherbro are not as advanced intellectually or socially as many of the other tribes. They are not so hard-working as the Mendis. They do not understand the art of weaving, their principal occupations being farming and fishing; they can, however, work up some of the fibres into excellent nets. They speak their own Sherbro language, and are useful as canoe-men and labourers. Their physique is on a par with the others, excepting the Mandingos.

In the lower countries, the Gallinas, otherwise the 'Vai' people, are distinctly ahead of all others on the Sherbro side, having their own written characters and language. Their tribe extends from Kase over the Mano river into Liberia. They are strict Muhammadans, and are specially noted for their superior weaving and the elaborate designs of their country cloths.

The Sierra Leoneans are found mostly in Freetown and the Peninsula. They are essentially traders. They speak a peculiar 'pidgin English', profess Christianity, and take a great interest in public religious services.

An interesting allusion is made to the Krumen colony in Krumen Freetown in the official report for 1908. The home of the Krus is that stretch of the coast which lies between Grand Bassa and Grand Lahou, but being a sea-going people they were at an early period attracted by the shipping trade to Freetown. The year 1908 was the

hundredth anniversary of their official recognition by the Sierra Leone Government, for it was in 1808 that General Thompson, governor of Sierra Leone, granted to them the special reservation in Freetown which they still inhabit. It is an interesting fact that although Krumen are found on the ships all along the coast, Freetown is the only place outside their own country to which they bring their families, and where they make any attempt at permanent occupation. This is due, no doubt, to the incentive to settle here given to them by Governor Thompson, who in the same year offered a premium of five guineas to each of the six Krumen who 'should first introduce their wives and families into the colony, and live with them in one or more distinct houses to each family, and cultivate a quantity of ground not less than two acres, for the space of two years'.

Govern-
ment.

Sierra Leone is a Crown Colony. The governor is aided by an executive council composed of the general officer commanding the troops, the colonial secretary, the attorney-general, the colonial treasurer, and the collector of customs.

The legislative council, of which the governor is *ex officio* president, is composed of the members of the executive council as official members, with the addition of the principal medical officer and the senior district commissioner, and four unofficial members nominated by the Crown.

For administrative purposes the colony and the protectorate are divided into the following districts :

Freetown Police District

Head-quarters ,,

Karene ,,

Ronietta ,,

Railway ,,

Koinadugu ,,

Sherbro ,,

Northern Sherbro ,,

Justice.

The judicial system at Sierra Leone varies according to the Colony proper, the Protectorate, and the area techni-

cally within the colony but now regarded as Protectorate, and subject to tribal authority. Certain limited powers are vested in the tribal headmen of Freetown and in the Peninsula villages. In the Protectorate the mass of the judicial work is performed in the chiefs' courts, which have jurisdiction in all civil and criminal cases between natives, with the exception of crime such as murder. Serious crimes and all important civil cases are disposed of by the circuit court, while the district commissioner's court possesses a jurisdiction analogous to that of summary and county courts in England in all cases in which non-natives or natives and non-natives are concerned. A force of about 250 civil police, under a European commissioner, is employed in the colony proper, whose duties, besides ordinary constables' work, are varied.

The official departments are the secretariat, treasury, customs, audit, post office and savings bank, judicial and legal, police, frontier police force, railway and telegraph, forestry, education, medical, and public works. Government departments.

The imperial military forces are represented by a battalion of the West India Regiment, a company of Royal Garrison Artillery, a company of Fortress Engineers, and a battalion of the West African Regiment, a native corps, &c. The barracks are at Tower Hill, Mount Auriol, and at Wilberforce Hill. There is also a frontier force under the colonial government, for interior duties, a native force numbering 600, under British military officers. Defence.

A municipal council was created in 1893. The mayor, elected yearly, is assisted by a council of fifteen, twelve of whom are elected by the citizens, and three appointed by the governor in council. The first mayor was Sir Samuel Lewis, a highly educated negro barrister. Local government.

Sierra Leone has seen many governmental changes. Up to 1874 it occupied the supreme position in the British possessions on the west coast of Africa. The governor was styled the governor-in-chief of the West Africa settlements, which included the Gambia, Sierra Leone, and the Gold Coast as far as Lagos. After the Ashanti War in 1873-4 the settlements were divided. Former governmental arrangements.

The Gold Coast and Lagos were created one government, while the Gambia remained under Sierra Leone. In 1886 there was another alteration, Lagos becoming a separate government, and later in 1886 the Gambia was severed from Sierra Leone, and since that time Sierra Leone has been alone.

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The Sierra Leone *Annual Reports* are admirably compiled and supply a fund of interesting information upon all topics in connexion with this Colony and its Protectorate.

The *Colonial Office List*, published annually.

A *Bibliography of Sierra Leone*, by H. C. Lukach, M.A., furnishes in classified form all necessary particulars in regard to the literature on this colony published since 1628 to 1910 (Clarendon Press, Oxford).

Maps of Sierra Leone are compiled by the Intelligence Branch of the War Office.

The works of T. J. Aldridge, I.S.O., *The Sherbro and its Hinterland* (1901), and *A Transformed Colony* (1910), contain in considerable detail descriptions of the country and of the peoples, with their manners and customs, collected during many years of residence in the Colony and Protectorate as H.M. Commissioner. These books also contain maps compiled by the Intelligence Branch of the War Office.

For Botany and Geology see official *Reports* by G. F. Scott-Elliot and Miss C. A. Raisin (1893), A. H. Unwin (1909), and C. E. Lane-Poole (1911).

CHAPTER XVIII

THE GOLD COAST COLONY, ASHANTI, AND THE NORTHERN TERRITORIES

BY MAJOR A. J. N. TREMEARNE

**Position
and
extent.**

THE Gold Coast Colony, Ashanti, and the Northern Territories are three adjacent strips of territory the boundaries of which are practically parallel to the coast-line of the Gulf of Guinea—so called either from *Genova*, 'black,' or (more probably) from Jenne, the once great city in the interior. The Colony proper extends along the coast for nearly 270 miles, being bounded on the north—at an average distance of about 130 miles from the coast—by Ashanti, above which, again, come the Northern Territories. The area of the whole is about equal to that of England and Scotland combined, being made



PLATE XXIII. SHERBRO, SIERRA LEONE (NATIVE ASCENDING
OIL PALM FOR CONES)
(Mr. T. J. Alldridge)



PLATE XXIV (*a*). TRAVELLING IN FOREST, NEAR
CAPE COAST, GOLD COAST



PLATE XXIV (*b*). AN ASHANTI VILLAGE
(Photo Major A. J. N. Tremeearne)

up as follows : the Colony, 24,200 square miles ; Ashanti, 20,000 square miles ; and the Northern Territories, 35,800 square miles. The eastern neighbour is German Togoland, from which it is divided partly by the river Volta, and partly by an irregular line running on each side of the meridian of Greenwich. To the west is the Ivory Coast (French), from which it is divided partly by the Black Volta, and partly by an irregular line running on each side of the meridian of 3° W. To the north also is French territory, the boundary being roughly the parallel of 11° N. The capital is Accra (or Akra).

The landscape generally is flat and low-lying, being broken only by conical peaks, with a belt of lagoons on the western and eastern frontiers. But from the shore, between Apollonia and Sekondi, at Cape Coast, and thence on to Berraku, there are gentle undulations, and the central portion of the coast-line is bold, while hills in the Akwapim district reach a height of over 2,000 feet. Farther inland the country assumes a hilly character, the chief ranges being the Akwapim, Akropong, and Krobo Hills (1,600 feet), merging into the Atiwa range in the north-east (2,000 feet).

There are no natural harbours, so passengers and goods are usually landed in surf-boats, which are thrown by the waves on to the beach, the best landing-places being at Axim, Dixcove, and Cape Coast Castle, behind rocks jutting out into the sea. At Accra steps have been taken to give artificial protection, and at Sekondi a jetty has been built by means of which surf-boats and lighters can be unloaded without having been beached, while at Ada a branch-boat passes from the ocean-going vessels in the roads over the dangerous bar at the mouth of the Volta to the harbour within.

There are several rivers, the greatest being the Volta (mentioned above), which has a length of about 900 miles, most of which is in British territory. Its course is extremely tortuous, and owing to this fact the Portuguese gave it the name by which it is now known. The Ankobra flows for the greater part of its course of 150 miles through

Physical
features.

auriferous country. The Prah is a sacred river, but although it has a length of nearly 400 miles it is almost useless commercially because of the cataracts. The Tano forms the lower part of the boundary between the Colony and the Ivory Coast; it is connected with Half Assini by the main lagoon.

Geology. Cretaceous rocks are to be found here and there near the coast, but they are usually hidden under later deposits. Basalt exists in the Axim district. Farther inland occurs a belt of sandstone and marl, with occasional bands of auriferous conglomerate. The alluvial deposits, as indicated in the native shafts, vary in depth from 10 to nearly 40 feet, being succeeded by a decomposed schist, and sometimes layers of cemented gravels are found consisting of pulverized quartz, mixed with pebbles, garnets, and black sands, embedded in a matrix of silica. These conglomerates resemble to some extent the 'bankets' of South Africa, but instead of consisting of water-worn pebbles (held together by a gold-bearing cement, in which they have been carried along for a considerable distance), the fragments of quartz have sharp edges, and it is evident that these West Africa conglomerates are of more recent date than those in the south of the continent. This wash has evidently been deposited by successive floods, sweeping from the north-east to the south-west, and meeting in their courses with tilted rocks and other obstructions, thus causing the hummocks, ridges, and isolated hills, upon which over-burden the forest thrives.

In Ashanti, the country rock is a granite, containing a large quantity of feldspar, with evidence of other igneous and metamorphic rocks. On the surface, and even to some depth down, there is a deposit of fine alluvium, then a clay matrix, having horizontal laminations, in which great numbers of small angular fragments of quartz are embedded. This alluvium contains small quantities of gold, the result of the denudation of the reefs in the vicinity.

Climate. The climate of the whole possession is hot, moist, and generally unhealthy, although Europeans can live much more easily in the interior than they can on the actual

coast-line, owing to the more open nature of the country, and to the absence of the great humidity which is always encountered near the sea. Accra, in spite of the improvements, has the worst reputation of all the European settlements in British West Africa. Europeans suffer more from fevers and dysentery than do the natives, but the latter are more subject to chest complaints. The mean temperature of the towns on the coast-line is from 78° to 80° F., this being slightly lower than that in the interior.

The rainy season lasts from March until November (with a break, however, in August), the first six months being known as the period of 'the greater rains', the remainder that of 'the smalls'. The rainfall varies in different parts of the country, usually in proportion to the density of the forest-belt. Axim and Tarkwa are particularly wet places, Accra is dry in comparison. The commencement and the end of the rains are marked by tornadoes, violent thunderstorms, accompanied by heavy rain. The storms uncover the filth which has been deposited during the preceding months, and the air becomes much polluted and unhealthy. At the end of the rains the falling rivers produce a similar effect.

From December to the beginning of March the harmattan blows. This is a very dry and cold wind from the Sahara, so dry, in fact, that the lips crack and the throat and nose become very sore. An extremely fine dust is usually held suspended in the air, which is at times almost motionless, and this may cause such a haze that it is extremely difficult to distinguish objects even at a hundred yards' distance in open country. It dies down as the day wears on, and the temperature then rises rapidly, falling again when the harmattan recommences in the afternoon. It is only in the interior, however, that the real harmattan is encountered—and there the difference between the midday and midnight temperatures may amount to 50° F.—for as one approaches the sea the phenomena become less and less pronounced, and on the actual coast-line there is more mist than dust.

On account of the prevalence of a sea-breeze from the south-west, the western three-quarters of the colony is known as 'the windward district', the remainder being 'the leeward'.

Vegetation and animal life.

The shore is usually a strip of glistening sand, and except at some spots west of the Prah, between it and the forest-belt there is a strip of country varying in width from 3 miles in the western districts to some 20 miles in the eastern, which is covered with palms and shrubs from 8 to 20 feet high. From Winneba to Ada this strip becomes a succession of wide grassy plains, dotted here and there with shrubs. At Accra euphorbias are to be seen. From Prampram to Ada the plains are farther from the sea and north of the chain of lagoons, which begins here and reaches to Lagos, the water in which is separated from the ocean only by narrow spits of sand.

About three-quarters of the colony is still primeval forest, and in it the sky is frequently hidden from view. The traveller proceeding to the interior finds that the vegetation is not overcrowded at first, so a fairly extensive view can be obtained, but the trees are still sufficiently numerous to give a shady sylvan aspect to the landscape, and although they are not so gigantic as those farther to the north, they are, nevertheless, imposing because their noble proportions can be all the better seen. In some places there are large groves of oil-palms, interspersed with plantains, the stems of the palms often rising to a height of 50 feet. As the trees increase in number, and the glare of the open country gives place to the shade and comparative cool of the thin forest, the forms of animal life exhibit a corresponding change, and many fresh ones appear. The ground is covered by a dense growth of herbaceous plants, and ferns, never seen nearer the coast, become abundant. Here and there are bamboo thickets, the canes growing in independent groups, but branching over and meeting at the top to form vast and gloomy natural crypts. Gradually the trees increase in height, and the vegetation becoming more and more luxuriant, a desperate struggle takes place for air and light, for 'a

place in the sun', the frequent electrical discharges no doubt helping the combatants in their fight for life. Every plant, from the tiniest to the most immense, rises erect and slender, drawn out to an absurdly disproportionate height in its endeavour to force its own head above those of its neighbours. The tangled vegetation fills up every available space, and the earth is hidden by a mass of herbage and ferns, while numbers of tottering decaying trees, some still leaning against a neighbour and not yet quite overthrown, are coated with thick velvety moss, a sign of defeat. Up from this leafy tangle spring the slender stems of bushes and small trees, and towering far above these the forest-giants rear their enormous trunks and shut out the heavens with an almost unbroken roof of foliage. Great creepers hang in long loops and festoons, twisting round everything within reach, and binding trees and bushes into a tangled impenetrable mass. And here and there, in the dim light that prevails, even at midday, in this natural crypt, looms some sturdy, great iron-tree, or an immense bombax, 200 feet high, perhaps, and nearly 100 feet in circumference, its branches encrusted with orchids, its trunk smeared with lichen, and its roots coiling over the surface of the ground like gigantic serpents. Other trees are there also, the mahogany, teak, ebony, and camwood among them, though these are less beautiful than they are valuable. Orchids appear on some of these, too, and are characteristic of the forest, but it is the lianas or 'monkey ropes' or 'tie-ties', mentioned above, which are the most conspicuous plants here, and are principally responsible for the weird aspect of scenery which makes so great an impression upon the traveller. Some, slender as twine, float like fairy cradles in the air; others, thick as a man's thigh, and coiled and re-coiled round each other, seem like aerial hammocks of some giant of the forest, and, indeed, often it is due entirely to their support that some of the larger trees remain upright.

The forest vegetation may be divided into three distinct strata. First, there is the immediate covering of

State of
forest
vegeta-
tion.

the surface, the lower undergrowth, consisting of herbaceous plants and ferns. A few of the former attract attention by their blossoms, especially a beautiful and fragrant white lily; but flowers of any kind are rare, and most of those which are found are small, faintly coloured, and odourless. The ferns, however, are in great profusion and variety, and the forest in some parts is a veritable fairy-land. Some of the ferns are curious climbing forms, which twine round the boles of the trees up to a height of perhaps 40 feet; others resemble dainty little maidenhair-like plants, only 2 or 3 inches high. The ferns seem to be quite at home in the dim light and moist air of the forest. They spread in clusters all over the surface of the ground, they pounce upon the spongy remains of fallen trees, they hide themselves in the dark corners between the huge buttressed roots of the great silk-cottons or in the crannies of rocks, or they droop with indescribable grace down shelving banks, daintily bathing their delicate fronds in the fairy forest streams. Meanwhile above stand the giants of the country, as if desirous of seeing their reflections in the quiet water, and anxious to know their fate in the never-ceasing battle. The second stratum of vegetation, consisting of the upper layer of the undergrowth, rises to a height of between 30 and 60 feet. It is composed chiefly of bushy plants and small trees, mimosas, and palms of various kinds, which reach a much greater height here in the forest than in the open, for their growth is almost entirely vertical, and this may be said of the herbage of the lower undergrowth also. The third or upper stratum is formed by the great forest trees, and it is these which modify the other vegetation by shutting out the light.

After having passed the forest-belt, the traveller enters 'the bush', and here the trees, although still high, are farther apart, and their branches begin lower down. The bamboo and the mimosa are here also, and the rubber-vine and other creepers are still plentiful at first, but gradually the weird fairy forest-land is left behind, and the country becomes more and more 'park-like',

i.e. the trees are smaller and more sparsely set. Here are found the wild plum, shea-butter, kola, baobab, dwarf-date, and fan-palm, and the beauty of the landscape takes a new form.

In the north-east corner there is splendid open country, which gives rich crops and pasture, and is capable, probably, under suitable conditions of transport, of supplying the whole of the Gold Coast with cereals and fresh meat.

The coco-nut palm, the banana (imported), and the plantain (the 'bread' of the native) are plentiful in most parts of the country, as also are the pine-apple, orange, mango, mangosteen, pawpaw, lime, and avocado pear. Other products include cassava, copra, copal, castor-oil, the calabar-bean, benniseed, piassava, ginger, okro, tiger-nut, ground-nut, yam, amankani, and maize, and the ramie and raffia fibres.

The fauna is not so rich now as formerly, for the advent of the European with his rifle, and the native huntsman with his imported long flintlock muzzle-loader, or 'Dane-gun', has rendered some species extinct. A few elephants are still to be found, and there are also buffaloes, antelopes (several varieties), leopards, hyenas, hogs, many kinds of monkeys, squirrels, sloths, otters, porcupines, manatees, and the ordinary domestic animals. Of reptiles there are pythons, cobras, adders (horned and puff), water-snakes, tortoises, crocodiles, and lizards.

The list of fish includes the herring, mackerel, grouper, sprat, sole, skate, mullet, barracouta, bonnetta, snapper, flying-fish, fighting-fish, shynose, and cat-fish. Sharks infest the mouths of the rivers, and in some parts turtles, crabs, cray-fish, lobsters, prawns, shrimps, sword-fishes, dolphins, and sting-rays are found. Oysters grow on the rocks and on the roots of the mangrove trees.

There are many birds, among them being parrots, hornbills, kingfishers, ospreys, herons, cross-bills, curlews, woodpeckers, doves, pigeons, storks, pelicans, swallows, pert-plover, and vultures.

The insect-world is represented by beetles, spiders, ants Insects.

(many varieties, some being very destructive to the crops), fireflies, butterflies, mosquitoes, moths, and flies (some of which destroy the native-grown cotton). The driver-ants are among the worst pests of West Africa. They are divided into several castes, the workers being about $\frac{1}{4}$ -inch in length, the soldiers about $\frac{1}{2}$ -inch, and the officers nearly $\frac{7}{8}$ -inch. The workers march in close formation, perhaps twelve abreast, forming a line some two inches wide, the soldiers being distributed along the flanks and at regular intervals amongst the workers, on much the same plan as that laid down for a British column in thick country. The force travels at the double, and generally at night, taking as straight a line as possible and selecting all available cover, an advance party having already prepared the way. These insects construct tunnels in exposed spots, perhaps 30 feet in length, with a height and breadth which may be as much as 1 inch, and provided with air-shafts. Every animal makes way for them, for they will attack anything in their path, even fire, their system of communication enabling them to send reinforcements to any threatened point.

Agriculture, &c.,
mining,
and manu-
factures.

Agriculture is the staple occupation of the natives living in the interior, and the statistics show that the value of the products has steadily increased. The greatest advance is in the cultivation of cacao (introduced into West Africa by the Portuguese), to which serious attention has been given latterly; whereas in 1891 the value of the export of that article was only £4, in 1910 it actually exceeded that of the gold-dust, and has since been showing a satisfactory advance. The industry is almost entirely in the hands of native farmers, so no accurate estimate has been formed of the area under cultivation. The exports of rubber and timber have also shown a steady increase, and there is but little doubt that with a more perfect knowledge of the cultivation and preservation of the former, and greater facilities for the transport of the latter, the improvement will be maintained.

The soil is so fertile that the native agriculturist of the past had but little to do for his living, and, having no

thought, except for the supply of immediate wants, his methods were wasteful, and certain articles (e.g. rubber) would soon have become extinct. But greatly improved conditions now exist, owing to the wise foresight of the government in establishing agricultural stations, where natives are taught how to practise economy and how to improve their land and its products. The first step was the establishment of a botanical station of some 50 acres at Aburi (in the north-east part of the Accra district) in 1890, under a curator from Kew Gardens, and since then hundreds of cacao plantations have sprung up all over the country. Certain of the natives were trained as instructors, and these now travel about in every district teaching the native landowners on their own farms, while thousands of plants are distributed annually from the central station to both Europeans and natives. Periodical agricultural shows also stimulate the native producers.

Other vegetable products are cotton, kola-nuts, plantains, and other fruits mentioned before, yams, cassava, peas, peppers, tomatoes, ground-nuts, Guinea-corn (millet), and maize. An experimental cotton farm was started in 1903 at Labolabo in the Volta district under the auspices of the British Cotton-Growing Association, but the cultivation of this commodity has not been an unqualified success owing to the lack of interest of the natives, and the depredations of the moth. The kola-nut is almost a necessity to the natives of the West Sudan, and this article had almost as great an effect as gold in promoting the commercial prosperity of Ashanti among the neighbouring native kingdoms, the Dyula acting as middlemen between the Melli (Mandingo) and the western Hausa trading districts. The nuts consist principally of starch, and contain a little caffeine and theobromine, to which substances is due the stimulating properties for which it is so much sought after. There has been a small European demand for the nut, which reappears in the shape of chocolate, wine, or biscuit. The plantain furnishes by far the greater part of the food of the natives, being eaten raw, roasted whole on the embers,

or beaten in large wooden mortars into a tenacious pulp called *fufu*. Of the peppers, the most famous were the 'Grains of Paradise' (though these come more from Liberia than from the Gold Coast), which were the rage in Europe between the tenth and the eighteenth centuries. From this arose the 'pepper-corn rent', a tax amounting to between £5 and £10. Queen Elizabeth was passionately fond of their taste, and their use in beer at last became so excessive that it had to be made illegal. Maize (Indian corn, or 'mealies') is an important article of diet, and two crops per annum may be produced.

Forest
products.

Of the forest products, there are many which are valuable commercially. One of the commonest of the timber trees, and certainly the most magnificent in appearance, is the bombax or silk-cotton, from the soft wood of which the native canoes or 'dug-outs' (because made of a single log hollowed out and chopped into shape) are made. Mahogany furnishes the bulk of the timber exports, but the teak (*Odum*) is even more valuable, and a species of ebony is obtained from more than one tree. Other trees furnish wood for paddles, shingles, and the Ashanti stools.

There is a great amount of rubber, both *Landolphia* and *Funtumia*, but extensive plantations of the Para variety have lately been established because it has been found that it thrives remarkably well in West Africa, maturing even more quickly than the *Funtumia*, and it is free from the local pests and diseases.

The oil-palm (*Elaeis guineensis*) is one of the handsomest and most graceful trees in West Africa, its plume of leaves being usually embellished by long drooping parasitical ferns. The natives use the oil in many of their dishes, and even the European enjoys a 'palm-oil chop', while it is exported to Europe to be used in the manufacture of soap and candles. The Volta district is the chief scene of the export, the oil-casks being rolled to the river, towed by canoes to Akuse, and taken thence by launches to Ada for shipment.

Minerals.

The Gold Coast is probably the richest area known in

proportion to its size. Here nature gives man very material assistance by placing at his disposal an immense mass of crushed débris containing dust and flour-gold, the latter deposited by the evaporation of the gold-bearing moisture produced by the rays of the sun. Furthermore, nature's poundings, roastings, and washings in the past ages have disintegrated the gold-bearing quartz, accumulated the precious metal thus set free, and deposited it in beds of clay. Gold therefore has from time immemorial been one of the principal exports of the country—hence the name—and since the pacification of Ashanti, gold-mining has gone ahead very rapidly. But gold is not the only hidden treasure, as indications of oil and coal have been found.

The native artificers in gold and silver and brass are exceedingly clever, models of implements, of human beings and animals, and even groups (e.g. a hunting scene) being cast in various places, and rings with the signs of the zodiac find favour on the coast. In the sense in which the word is usually understood in European countries, however, there are practically no native manufactures. Certainly there is a good deal of native cloth woven by primitive methods from the native-grown cotton and dyed with the native-grown indigo into strips some four to six inches in width. Salt is roughly prepared from the lagoons between Accra and Kwitta, and is sent to the north. Bags, bottles, &c., are made of leather for local use and for export. And there are several kinds of baskets, pots and other household utensils (many of them having ornamental stoppers and being profusely decorated with geometric designs), canoes and fishing-nets made by the natives for their own use. But these are not strictly manufactures, and the building and repairing of the rolling-stock in the railway workshops, the production of bricks, tiles, and cement in the European factories, and the aeration water for drinking purposes, are not of native origin.

The fisheries of the coast employ about 5,000 canoes and a proportionate number of people, for there is a considerable trade in dried fish, particularly with the natives

in the interior. No fishing takes place on a Tuesday, however favourable the climatic conditions, for that day is sacred to the fetish of the sea, so the fishermen rest then or repair their nets if necessary. A good deal of salted fish is imported from the Canary Islands, the supply of native-cured fish not being sufficient for the requirements of the community.

Transportation : rivers. The Ankobra is navigable for about eight miles by light launches, but its chief interest is that in it heavy timber is floated down for the mines. The Volta is navigable by launches for some sixty miles, and is the centre of the oil industry ; it forms the most direct route to the Northern Territories. The Tano forms the lower part of the boundary between the Colony and the Ivory Coast. It is connected with Half Assini by the main lagoon and by tram, and it is navigable by light launches as far as Tanoso, some sixty miles up-stream. All these rivers have sand-bars at the mouths, which prevent the entrance of ocean-going steamers, except for the branch-boat at Ada, as has been mentioned.

Railways. A railway (gauge 3 feet 6 inches) runs from Sekondi to Kumasi via Tarkwa (whence a branch line runs to Prestea), and is 168 miles in length. It was finished in 1902, the total cost being nearly £2,000,000, this figure including the sums for the provision of rolling-stock, permanent bridges, offices for the staff, and landing-jetties. In the rate per mile (about £10,000) and the rapidity of construction, it compares very favourably with some of those of neighbouring countries under foreign protection. Another line to Kumasi starts from Accra, passing through Mangoase. A Caillet's mono-rail runs around the rapids at Krachi. There is no doubt that the country is rich enough to support large extensions in the length of the lines.

Roads. Horse-drawn vehicles are in use in certain parts, and motors have been tried, but away from the railway line head-porterage is the rule, and it is not likely that the carrier with his load weighing from 50 to 70 lb. (or much more if it is his own) will ever be displaced. Europeans

travel on horseback in the Northern Territories, in some parts of Ashanti, and near Accra (i.e. in the districts comparatively free of the tsetse-fly), but elsewhere they are carried in hammocks.

The chief roads are maintained by the Public Works Department, but the others are under the care of the chiefs of the respective districts through which they pass, a certain amount per mile being paid by the Government for their upkeep. Where a chief neglects to perform this duty, the department takes it over, and the chief may be punished.

There is a weekly express passenger service of the Shipping. Elder Dempster Service (African Steamship Company, the Elder Line, and the British and African Steam Navigation Company) from Liverpool, Accra (about 4,000 miles) being reached in a fortnight. There are also services of cargo boats running at less regular intervals which have limited passenger accommodation. The same company runs steamers to the west coast from London and from Hamburg. The Woermann line sends two mail steamers monthly from Hamburg, calling at Dover on the homeward voyage, and French boats from Marseilles and Dunkirk call at ports along the coast at irregular intervals, as do the cargo boats of several lines from various ports.

Owing to its great riches and also to the fame of the Trade. warlike inhabitants who guarded them, the Gold Coast (and particularly that part of its hinterland, Ashanti) has always been much more in the public eye than has any other West African possession. Nor was the attention undeserved, for even now the value of the gold-dust exported is enormous (being far above that of any other item except cocoa), and it was only in 1900 that the Ashantis were finally conquered after a long series of conflicts in which we were not always successful. The other chief exports are rubber (most of which comes from Ashanti), timber, palm-oil, and kola-nuts. The principal imports are cotton goods, machinery, spirits, tobacco, rice, sugar, and other provisions, and beads.

Once Ashanti had been finally reduced, and the railway to its ancient capital, Kumasi, had been opened, the trade advanced by leaps and bounds. But even yet, full advantage has not by any means been taken of the possibilities of the country, for in addition to its already proved mineral wealth, there are still virgin forests of timber and much fertile soil yet untouched, though capable of growing cotton, rubber, cocoa, coffee, copra, fibres, and other commodities. The government prefers to encourage the native agriculturist, however (under a certain amount of official European supervision), rather than to give concessions to British companies.

Of the total trade, over 66 per cent. is with the United Kingdom or with other British colonies, Germany being second on the list, then France, and then the United States of America.

Popula-
tion.

The population of the whole possession (Colony, Ashanti, and the Northern Territories) is about 1,500,000 (Census, 1911), including some 2,000 Europeans, mostly miners, officials, or traders, about one-half of the number being in the Colony itself. It is estimated that over 3,000 labourers enter the Colony each year in order to obtain employment, leaving again when the work has been completed.

The Fanti were the first to come into contact with Europeans, and by their means the vast riches of the countries lying beyond came to be known. The Fanti and the Ashanti are supposed to have had a common origin, and both have been conquering races, though at the present time the Fanti is very much inferior in every way to his northern neighbour. These people live in the more westerly parts of the Colony, and, with their exception, the districts are usually named after the tribes inhabiting them. The Accra are held by some authorities to be the descendants of the original inhabitants of the country; they are now on a fairly high level, many of them being excellent artisans or sailors. The Ahanta (one of the tribes of the Accra stock) in the west of the Colony were at one time much feared because of their prowess in

war. The Apollonians, a kindred race, live on the Ivory Coast border, the handsomest of the negroes, and the first to be enslaved. Other important tribes are the Akim in the north-east part of the Colony, the Akwapim living next to them to the south, and Adangme on the marshy ground near the Volta, the Krobo between the last named and the Akim, and the Asin south of the Prah. The Ashanti are divided into various tribes, of which the chief are the Bekwai, Adansi, Juabin, Kokofu, Kumasi, Mampon, 'Nsuta, 'Nkwanta, Dadiassi, Daniassi, Ofinsu, and Adjisu. In the Northern Territories are found large colonies of Hausa, immigrants from the east in all probability, and Mossi and Dagomba who speak the same tongue. The Hausa are the great travellers and traders of West Africa, and are found at many places between Alexandria and Tunis in the north, Senegal in the west, and Lake Chad in the south-east.

The Tshi language group greatly predominates on the Gold Coast, being divided into two principal sections, the Akan and the Fanti, and although these again are subdivided into numerous dialects, the difference between them is not very great, and a man from one part of the country can usually make himself understood in another. The River Volta forms a rough boundary between the Tshi- and the Ewhe-speaking peoples. In the south-eastern corner Ga (Accra) is spoken, and this also has several dialects.

The first British settlement was that of Koromantine Government, &c. in 1618, and soon after it had been established, Cape Coast Castle, Accra, and other settlements were captured from neighbouring European Powers with which England was at war. In nearly every case, only so much of the surrounding country was under control as lay within range of the guns of the fort, and no semblance of European authority was to be seen outside. This state of affairs was made worse by the fact that many of the forts belonged to different nations at different times, being taken or retaken whenever reinforcements arrived from Europe for one side or the other. In 1672 the Royal African

Company established forts along the coast, and other companies followed, the affairs of as much territory as they could get being administered by the servants of the companies. But in 1821 the British Government took over all the settlements, and placed them as a whole under the Governor of Sierra Leone, and they continued thus (except for a short period) until 1874, when they were combined, with some territories purchased from other European Powers, to form the Gold Coast Colony.

The Ashanti had been defeated in 1873 by Wolseley, but it was not until 1894 that a Resident was installed in Kumasi, and it was only in 1901 that Ashanti was annexed, by which time the Northern Territories of the Gold Coast had already been constituted (i. e. in 1897) by agreement with France and Germany.

At the present time, the Colony proper is administered by a Governor, an Executive Council composed of nominated members, and a Legislative Council to which both official and unofficial European or native residents are appointed. Ashanti and the Northern Territories are under their respective Chief Commissioners, who are directly responsible to the Governor of the Colony, but they rule through junior officers in charge of districts, who again rule through the native chiefs.

Law

The law of the Colony proper is a mixture consisting of the common law of England, the doctrines of equity, and statutes in force in England up to 1874, but local ordinances passed by the Governor-in-Council may modify or be substituted for any of these, or may be enacted to cover new issues. The criminal law was codified in 1892. In purely native cases, customary law is not interfered with unless in conflict with local ordinances (which do not apply to Ashanti and the Northern Territories unless the contrary is stated), or unless repugnant to British ideas of justice.

Defence.

At first the defence of the settlements, then separate and distinct, was carried out by the servants of the several companies, and even after the government had taken over the forts, no special effort was made to

enlist native troops. In 1852, however, the Gold Coast Corps was raised, and this became the Gold Coast Artillery Corps five years later, but it had to be disbanded in 1863 because it became unreliable. A Hausa Force was brought by Glover from Lagos (raised there in 1865) to take part in the Ashanti Expedition of 1873, and from this grew the Gold Coast Constabulary ('Gold Coast Hausas') six years later. After Willcocks's expedition, the Northern Nigerian system was adopted, and in 1901 the Hausas and others became a regiment of the West African Frontier Force ('Waffs'), consisting of two battalions of infantry and a battery of artillery, the 2nd battalion being disbanded six years later. In addition to these, there are several volunteer corps and gun-detachments, some of which are formed entirely of Europeans. The civil police also have sprung from the Gold Coast Constabulary.

The bulk of the land in the Colony belongs to the tribal 'stools', and, theoretically, there is no land without an owner. The definition of the exact boundaries of tribal lands is often very difficult, as towns and villages have sprung up independently, with large tracts of intervening land, sometimes dense forest, at first unoccupied but brought gradually under cultivation from all sides. The decision in cases of dispute is made in accordance with native law and custom.

There is a Government savings bank, the Bank of British Money. West Africa has branches in many towns, and penny banks exist in some of the schools. The currency and legal tender are British, but certain Spanish, French, German, and American coins are accepted. Gold-dust is still used by the natives, but cowrie-shells are not now much in request owing to their bulk and to the people's acquaintance with the valuable and more portable metals. The weights and measures in use are the same as those used in England, except that natives in the Windward District use for the purchase of small articles gold weights representing $1\frac{1}{2}d.$, $2d.$, $3d.$, $4\frac{1}{2}d.$, $5d.$, and $9d.$ The last is named *teku*, and six *teku* are equal to one *akki*, which is approximately $\frac{1}{16}$ oz. troy.

Culture. Fetishism is the prevailing religion still, although Christianity and Islam are making rapid strides, particularly the latter. There are numerous European missions, the Moravian (founded in 1736), the Basel (1828), and the Wesleyan (1835) being the oldest. There are Anglican churches at Accra and Cape Coast with colonial chaplains, and many churches, chapels, and Sunday schools exist in other parts.

There is a great number of government and private primary schools, some of which are assisted by the Government financially, the majority of these belonging to the Basel and Wesleyan Missions. The Government encourages technical and industrial training. The educational machinery of the Colony is controlled by a Board of Education consisting of members of the Legislative Council and others appointed by the governor.

The first Government Printing Office was established by Governor McLean in 1840. There is now a large office capable of doing all the official work. There are several newspapers published by educated natives.

Telegraph. All the principal towns are connected by telegraph, and some have local telephones. When first installed, large lengths of telegraph wire were being stolen continually for fetish purposes and for use as ammunition, so the chiefs were made responsible for the maintenance of the lines in their respective districts.

Bibliography. See *The Colonial Office List* (Annual); *The Annual Report*; *The Gold Coast Civil Service List* (1911); *The Gold Coast, Its Wealth and its Health*, by F. Hart (1904); *Britain Across the Seas*, by Sir H. H. Johnston; *The Niger and the West Sudan*, by A. J. N. Tremeearne (1910); *Travels and Life in Ashanti and Jaman*, by R. A. Freeman (1898); *Gold Coast Palaver*, by L. P. Bowler (1911); and *The Encyclopædia Britannica*. A good map (1:125,000) and an index giving the position of every town, village, river, &c., in the Colony, has been prepared by Major Guggisberg, R.E.

CHAPTER XIX

NIGERIA

BY J. D. FALCONER

THE British possessions in the neighbourhood of the River Niger have hitherto been known respectively as Southern and Northern Nigeria, and although they were in 1912 grouped together under the single title of Nigeria, it is useful for descriptive purposes still to retain the old names as convenient designations of regional divisions. The united colony is situated wholly within the tropics, between 4° and 13° N. lat., and with the exception of the Niger delta and the coastal plain lies entirely upon the continental plateau, with an average elevation of 1,000 feet. It possesses a total area of 335,600 square miles, and is bounded on the north and north-east by the French Sudan, on the east by the German Kamerun, on the south by the Gulf of Guinea, and on the east by French Dahomey. The most striking physical feature of the colony is the river system of the lower Niger and the Benue, with the extensive delta of the Niger projecting into the Gulf of Guinea between the Bights of Benin and Biafra. The great inland extension of the colony, however, affords scope for much variation in the physical character of its surface. The southern creeks and forests give place northward to open park-like plains; mountains and plateaux rise within the colony to heights of over 4,000 feet above the sea; while in the extreme north-east the British possessions extend inward to the margin of the northern desert and to the swampy shores of Chad, the mysterious lake of the central Sudan.

Natural Conditions

All along the seaboard of Nigeria there stretches a belt of low-lying land, a region of swamp and almost impenetrable forest, varying in width from 5 to 15 miles

Position
and
extent.

The
coastal
plain and
Niger
delta.

in the neighbourhood of Lagos to 60 or more in the Niger delta. In the west the shore is fringed by a system of lagoons which communicate with the Gulf of Guinea by narrow channels, half blocked by sandy bars. Into them the rivers from the interior discharge the sediment brought down by their waters, with the result that the lagoons are slowly shallowing into muddy flats. In places these flats are three or four miles in breadth, but, except in the navigable channel, the water rarely exceeds 4 feet in depth. When the channel is kept sufficiently cleared of sadd, however, this system of lagoons and estuaries running parallel with the shore-line for more than 150 miles within the colony provides an inland water-way for small steamers of light draught from Lagos eastward to the Benin River.

It is believed that the formation of these lagoons is only in small part attributable to the constructive action of the sea. The belt of land on the south side is too broad to have been produced simply by the piling up of sand and mud and gravel by the waves and tides and currents. Moreover, in places on the south side are found low hills, 40 feet or more in height, composed of the same red clays and sands which predominate on the mainland to the north. It seems probable, therefore, that the formation of the lagoons was due primarily to a slight submergence of the southern portion of the coastal plain, which allowed a shallow sea to cover the sunken stretch between the mainland and an out-lying fringe of islands. This space in time became partially silted up by the delta deposits of the rivers, while the channels between the islands became obstructed by bars of sand built up by the waves.

To the eastward there projects into the Gulf of Guinea the great delta of the Niger, built up almost entirely of alluvial deposits, while beyond lies the estuary of Calabar, mainly formed by the Cross River. In Calabar there is some evidence that, as in the case of the lagoons of Lagos, the formation of the delta was at first due in part to a slight submergence of the foreshore. The original coast-line probably formed a gentle curve from the Lekki

lagoon eastward between Abo and Onitsha to the mouth of the Cross River. To the south of this line now lies a vast network of rivers and creeks and swamps, the interlacing arms of the delta, lined with dense vegetation and separated by strips and patches of drier ground covered with primaeval forest. In the brackish tidal waters the high-arching roots of the mangroves serve to moor the slime, and thus provide a suitable foundation for yet another step outward into the ocean.

From Benin northward almost to the bend of the Niger at Egga, and from the Cross River northward to the Benue valley, stretch the southern forests, which to some extent obscure the irregularities of the surface. The southern portion bordering the delta is low-lying and undulating, frequently swampy, but rising towards the north. The extreme east, however, in the bend of the Cross River, becomes rocky and mountainous in the Oban Hills (3,000 feet); the Udi plateau interposes between Onitsha and the Cross River; a great series of ridges and escarpments runs east and west to the north of Afikpo; while the Kukuruku Hills rise to a height of 1,800 feet to the north-north-west of Asaba. In the region of the confluence of the Niger and the Benue the surface of the dissected plateau into which the rivers have cut reaches a height of 1,200 feet above the sea, while from the Oban Hills north-eastward along the German frontier runs a tract of broken and difficult country which culminates in the Sonkwala Mts. in peaks over 6,000 feet in height. The surface sinks again to the Benue valley in the north, where much of the great plain of Muri is under 600 feet above the sea.

With the exception of the uplands of Udi and parts of the middle Benue valley where grass-land is in places abundant, the whole of the region is covered with forest, and there are few or no open spaces except where the bush has been cleared for villages or farms. Naturally, however, over such an immense area there is much difference in the type of forest growth. On the lower ground nearest the delta the forest is high, dense, and evergreen, but with increasing

latitude and decreasing rainfall the forest becomes lower and more deciduous, until over wide areas in the Munchi country and on the upper Benue it is reduced to a grassy orchard-bush with tall trees intermingled. On the lower Benue, however, and in the region of the confluence, along the banks of the rivers and streams, and wherever the land is low-lying and well watered, the characteristic high bush reappears in vigorous growth.

The Lagos
hinter-
land.

To the north of Lagos and beyond the coastal strip of lowland, the surface rises gently to a height of 1,200–1,500 feet to form the fertile plains of Yorubaland. This higher region of lessened rainfall, inhabited by a more progressive race, has been largely cleared of bush and more extensively cultivated, and now presents a park-like aspect with scattered patches of forest and strips of woodland along the water-courses. Detached hills, isolated kopjes, and smooth rounded turtlebacks of granite project at intervals from the plain and form prominent features in the landscape. This type of scenery prevails throughout Ibadan and Ilorin, and extends northward almost to the Niger at Jebba. The plains of Nupe beyond the Niger present a somewhat similar appearance, though here the isolated hills which rise from the sandy plains assume more frequently a tabular or pyramidal form.

The cen-
tral belt
of hills.

From Jebba and Borgu eastward to Yola and approximately along the tenth parallel there stretches a belt of hilly and mountainous country whose peaks in the Murchison Range rise to a height of 6,000 feet above the sea. In the middle of this belt, in the vicinity of 9° E. long., is interposed the Bauchi plateau, whose surface lies at an average elevation of 4,000 feet. Precipitous walls mark off the southern limit of the plateau from the plains of Muri and Nassarawa, while to the north it descends in a series of steps or terraces to the higher plains of Zaria and Bauchi. The whole of this tract of country is broken and rocky and particularly difficult to penetrate, and has therefore become the refuge of innumerable primitive tribes who have been driven to the hills by the conquerors of the northern plains. With

the exception of the Bauchi plateau, which is practically treeless, the greater part of this belt of country is lightly forested and covered with a thin deciduous bush.

Beyond the central belt of hills there stretch northward towards the desert the fertile plains of Hausaland and Bornu, the great savanas of the central Sudan. In the neighbourhood of Kano and Zaria, these great rolling plains lie at an average height of 1,800 feet above the sea. In the west, however, towards Sokoto, they fall to an average elevation of 1,100 feet, while in Bornu they sink gradually north-eastward to Lake Chad, which occupies a tectonic depression only 800 feet above sea-level. Where uninhabited these plains are covered with scattered orchard-bush which becomes prickly towards the north. In Hausaland, however, the greater part of the surface is under cultivation, and the landscape presents a park-like aspect with kopjes, domes, and turtlebacks of granite or isolated groups of hills rising at intervals from the undulating plains. Much of Bornu is bush-covered in the west; blown sand predominates on the northern frontier, while in the east and in the neighbourhood of Lake Chad large tracts of low-lying country are annually flooded during the rains.

The
northern
plains.

Over more than half of the united colony, the fundamental crystalline basement of granites, gneisses, and schists rises to the surface. These rocks extend (1) over much of the Lagos hinterland from Abeokuta northward through Yorubaland and over the greater part of Kabba, Ilorin, and Borgu; (2) from the Oban Hills in the bend of the Cross River north-eastward along the Kamerun frontier and through the Shebshi Hills to Yola; and (3) over the greater part of the northern plains, the central belt of hills, and the Bauchi plateau, where the granites become rich in tinstone. Cretaceous sandstones, shales, and limestones, fossiliferous and often salt-bearing, extend from the Cross River northward through the Munchi country to the Benue valley, and thence eastward to Yola and up the Gongola valley as far as Nafada. Tertiary (Eocene) sandstones, ironstones, clays, and in places

Geological
structure.

lignites extend eastward from the neighbourhood of Lagos through Asaba on the Niger to the Udi plateau, thence up the Niger valley by way of Idah, Lokoja, Baro, and Bida to Ilo, Gando, and Sokoto. Sandstones, clays, and iron-stones, probably of similar age, occur also in Kerri Kerri, Gombe, Duguri, and on the upper Benue. Pleistocene and recent deposits are represented by the loosely compacted Benin sands and clays which cover much of the surface in Lagos, Benin, Asaba, and Calabar, by the alluvium of the Niger delta and of the Chad basin, and by the accumulations of drifted alluvium and blown sand of variable depth which extend over the greater part of the surface of the northern plains. Centres of volcanic activity formerly existed on the Bauchi plateau and in southern Bornu, and a line of extinct volcanoes of varying age now connects the eastern and the western foci. Groups of *puy*s are found also on the middle Benue in the neighbourhood of Awe, and the Shebshi Hills on the Kamerun frontier are in places capped by basaltic lavas. The formation of the Bauchi plateau has been ascribed to differential elevation during some recent period of crustal movement.

Hydro- graphy.

The river system of Nigeria is believed to be entirely of recent origin and intimately related to a series of intersecting flexures into which the surface of the continent was thrown during a recent period of crustal warping. The rivers fall naturally into four major groups: (1) the rivers to the west of the Niger, the Ogun, Oshun, and Oni, discharging into the Lagos lagoon, the Oluwa, Owena, and the estuary of the Benin River which is connected by creeks with the Niger delta; (2) the rivers to the east of the Niger, the Imo, Kwa Ibo, Cross, and Calabar Rivers; (3) the Niger-Benue system and the southern delta, with the Rima, Kaduna, and Gurara, tributaries of the Niger, the Okwa, Modu, Ankwe, Gongola, Tarabba, Donga, and Katsina, tributaries of the Benue, and the fourteen principal mouths of the delta, of which the rivers Forcados and Nun are the largest and the most important; (4) the Yo and the Yedseram

forming part of the inland or Chad system in the north-east.

The primary watershed which separates the Niger-Benue system from the inland or Chad system runs south-south-east from the neighbourhood of Katsina to Bukuru on the summit of the Bauchi plateau, thence north-eastward to Gujba in Bornu and then south-east to the Yola border. The watershed separating the Niger system from the rivers to the west runs east-south-east from Ogbomosho to the Kukuruku Hills and thence southward between Benin and Asaba parallel with the Niger, while that between the Niger and the rivers to the east runs approximately south to north through the Udi plateau, describes a semicircle to the north-east round the Cross River system, and meets the Kamerun frontier in the Sonkwala Mts. These watersheds do not to any great extent coincide with belts of hills or lines of mountains. On the contrary, they run imperceptibly along the crest-lines of the higher plains, and the headwaters and tributaries of the larger rivers in most cases flow placidly for long distances in wide and shallow channels over the upper plains before descending by rapids and waterfalls to join the trunk streams. This peculiarity of the river system is one of the proofs of the recent establishment of the present hydrographical régime by the irregular elevation of a former peneplained surface.

Of the various groups the Niger-Benue system is the most important. It provides a system of inland waterways by means of which at the height of the season direct access may be had by way of the Benue and Gongola to Nafada on the eleventh parallel, 200 miles from Lake Chad and 900 miles from the sea. The Niger itself is navigable as far as Jebba, and the Kaduna to Wushishi, but above these points the channels are blocked by waterfalls and rapids. The Benue, on the other hand, and many of its tributaries, are navigable in the season for their whole length within the colony. It is characteristic of the rivers of the colony, however, that their catchment basins possess com-

paratively small reservoir capacity, thus occasioning quick rises in the water level and rapid falls in the amount of discharge. Further, during the dry season, on account of the enormous amount of evaporation, most of the smaller streams cease flowing and the water in the larger rivers becomes very low. The rise of the Niger and the Benue due to local rainfall takes place in August and September, and may amount to as much as 35 feet above low-water level.

A small portion of Lake Chad falls within British territory. The lake occupies a shallow tectonic depression in the continental surface, varies much in extent according to the season, rarely exceeds 4 feet in depth, and reaches its maximum in the month of February. The water is fresh, but becomes brackish on the margins towards the end of the dry season. Pools of water, more or less temporary in character, occupy occasional hollows in the drift-covered surface of the northern plains, but they rarely persist throughout the dry season. Around Awe on the middle Benue, and in the Munchi country to the south, small salt lakes are common, fed by brine springs in the vicinity. There is, however, a remarkable absence of permanent freshwater lakes throughout the whole colony.

Meteoro-
logy.

Southern Nigeria is well equipped with meteorological stations, and continuous records have been kept for a series of years. Less accurate information is available with respect to Northern Nigeria, where the stations are further apart and more recently equipped.

Tempera-
ture.

Over Southern Nigeria the average maximum shade temperature is 91.45° F., and the average minimum shade temperature 65.47° , giving an average mean temperature of 78.5° . In Northern Nigeria, however, while the mean daily temperature is about 80° , and little above the average for Southern Nigeria, the diurnal range is everywhere much greater than in Southern Nigeria and greatest towards the north. The greatest diurnal range of temperature in 1911 was 39° at Sokoto in January. The greater range of temperature in the

northern territory is due to the less relative humidity of the atmosphere and to the absence of forest, which encourage greater insolation by day and greater radiation by night.

The tropical rains follow the sun northward in the Rainfall. summer, with the result that the southernmost portions of the colony receive the earliest and the heaviest rains. In Southern Nigeria three rainfall belts may be distinguished, having respectively over 100 inches, over 75 inches, and under 75 inches of rain per annum. The greatest rainfall is precipitated in the Niger delta, and varies from about 100 inches at Abo to 150 inches at Calabar. The boundary between this belt of excessive rainfall and the second belt runs from the Benin River east-south-east through Abo at the head of the delta to the neighbourhood of Calabar on the Cross River. The second belt includes the lagoon system of Lagos, and its northern boundary curves eastward by way of Benin city, Onitsha, and Afikpo to enclose the Oban Hills on the eastern frontier. The remainder of Southern Nigeria has less than 75 inches of rain and the average rainfall decreases rapidly with distance from the sea. In Northern Nigeria data are wanting for a subdivision into belts. The rainiest regions, however, are the south-west provinces, the central belt of hills, the southern margin of the Bauchi plateau, and the Shebshi Hills on the Kamerun frontier. Even in these districts the rainfall rarely exceeds 55 inches per annum; while on the northern plains it sinks to an average of 33·5 inches at Kano and 26·5 inches at Sokoto. In 1910-11 the greatest rainfall in Northern Nigeria was 56·44 inches at Ankpa in Bassa province to the south-east of Lokoja, and the lowest 16·87 inches at Geidam on the north-east frontier of Bornu.

Nigeria experiences a regular alternation of rainy and Seasons. dry seasons. In summer a low-pressure system forms over the Sahara and south-westerly rainy winds blow inland from the Gulf of Guinea. In winter the equatorial low-pressure system reasserts itself and dry dust-laden winds (*harmattan*) from the north and north-east blow

outward over Nigeria. In Southern Nigeria the dry season extends over five months and the rainy season over seven, heavy rains falling from April to July and light rains from August to October. The *harmattan* blows regularly from December to February, and there is a pronounced tornado season before the rains begin. In Northern Nigeria the dry season extends over seven to nine months according to latitude, and the rainy season over three to five, the rains being preceded and followed by a tornado season of variable length. The lowest minimum temperatures are experienced during the *harmattan* season (November to February), and the highest maximum temperatures at the change of the seasons before and after the rains.

Vegeta-
tion.

The mangrove is the characteristic tree of the delta, where it lines the estuaries of the rivers and creeks. The stem, whose average girth is about 18 inches, is raised above the mud on numbers of stout arching roots. It grows only in brackish tidal waters, and on the Niger and Cross Rivers ceases at a distance of 60 miles from the sea. Beyond the limit of the mangroves the land becomes drier and firmer and clothed with a dense and lofty forest and a thick undergrowth of creeping and twining plants. Palms of many kinds form the characteristic vegetation, interspersed with giant trees often 200 feet in height and 16-20 feet in girth. Hardwoods are abundant, including mahogany, ebony, teak, redwood, African cedar, and plane, but the most noticeable of all are the silk-cotton trees (*Eriodendron bombax*) with smooth bark, straight columnar shafts, and great buttressed roots festooned with gaudy creepers. Rubber vines are characteristic of the undergrowth, and tree-orchids flourish on decaying and fallen branches. Further north the forest belt changes into an open orchard bush of luxuriant grass and herbs and scrubby trees, with rich forest only in the river valleys. The kuka or baobab tree (*Adansonia digitata*), with its gnarled and knotted arms and fluted fleshy stem, replaces the cotton tree as the most prominent member of the bush, while locust trees, shea-nut trees, and tamarind trees become much

appreciated for their shade. Bamboo is common along the water-courses of the central belt of hills, and fan or deleb palms (*Borassus*), 60–80 feet in height, become characteristic of the flood-plains of the rivers. In the more arid regions of the north acacias and mimosas predominate and form in places dense low-growing prickly bush, while date-palms occur in clusters near the springs.

The mammalian fauna of the southern forests is closely related to that of the great forests of the Congo and Kamerun, while the fauna of the northern plains is similar to that of Senegal, the two types intermingling on the lower Niger and in the Benue valley. The high bush, wherever found, is the home of several varieties of monkeys and baboons, but the chimpanzee is unknown. The African elephant is found in the open forests of the south, and, though less abundant than formerly, ranges northward through the Benue valley to Lake Chad. The hippopotamus is abundant in the larger rivers, and is found also in Lake Chad and the River Yo. Crocodiles are common, up to 20 feet in length, among them the sangwar, a web-footed variety in the Niger. The rhinoceros is unknown in Nigeria, although it is found in the Shari River immediately to the east. The thin bush and the open grassy plains of the Lagos hinterland and the middle Benue valley, and the well-watered portions of the northern plains, are inhabited by numerous ungulates with associated carnivores. The most important of these are the Nigerian giraffe (rare), the West African hartebeest, the Senegal hartebeest, the West African oribi, the water-buck, cob, eland, koodoo, roan antelope, bush-buck, lion, leopard, hyena, and jackal. Various gazelles, including the Dorcas gazelle, are found in the neighbourhood of Lake Chad. Wild cats, bush-pigs, porcupines, and squirrels are common in the forest; rats and mice are particularly abundant, while rock dassies (*Procavia*) abound amongst the granite boulders.

With respect to birds Nigeria has been divided into three distinct geographical areas:

- (1) The dense forests of the south, inhabited by

forest thrushes, fly-catchers, orioles, woodpeckers, forest weavers, parrots, hawks, and hornbills.

(2) The open forests and river valleys to the south of the central belt of hills, inhabited by birds of a Senegambian type, including sun-birds, reed-warblers, bee-eaters, blue jays, francolins, guinea-fowl, doves and wood-pigeons, sand-plovers, wild ducks and geese, pelicans, ibises, crowned cranes, marabout storks, white egrets, fish-eagles, and vultures.

(3) The northern plains, with a Sudan fauna of larks, finches, rock-sparrows, sand-grouse, nightjars, bustards, woodpeckers, starlings, barbets, and shrikes, with hornbills in the baobab trees and sun-birds in the mimosas.

In native villages the yellow weaver is usually conspicuous, while vultures and kites act as scavengers. Waxbills are abundant on the waste and fallow land around. In the north long stretches of bush are found untenanted, the birds apparently congregating in groups and travelling together. Giant bats are the denizens of the high bush on the river banks, and flocks of thousands may be seen insect-hunting in the evenings as far north as the lower Kaduna. The principal game-birds are francolins or bush-fowl, guinea-fowl, rock-pheasants, sand-grouse, and bustards. Practically the only song-birds are the red thrush and the reed-warbler. The ostrich is reared in the north and is probably indigenous to the country.

Reptiles
and
insects.

Reptiles are numerous and include puff adders, vipers, tree cobras, burrowing snakes, and pythons. Many of them are poisonous, but deaths from snake-bite are comparatively rare as compared with the mortality from this cause in Asia, America, and Australia. The West African chameleon is common, and gaily coloured lizards are everywhere abundant. Scorpions are numerous and their sting is much dreaded by the natives. Insect pests are characteristic of the country. The mosquito is everywhere, except upon the Bauchi plateau and the northern plains in the dry season. Fireflies and flying ants abound on the rivers; tsetse and other cattle-flies are found

everywhere to the south of the eleventh parallel during the rains, but in the dry season to the north of the Benue they are confined to the river banks and to certain belts of forest. Sandflies are characteristic pests of the open country in the north, while the jigger, a recent introduction, is dreaded in the south. Termites are common in the less forested parts, and driver ants in the moister regions of the south.

The rivers teem with fish, and many different kinds are ^{Fish.} caught and used as food by the natives. The West African mudfish (*Ceratodus*), the sole survivor of a very ancient type, is one of the greatest delicacies. The fish fauna of the Senegal and Niger rivers has been known for some time to be similar to that of the Nile. It has only recently been proved, however, that the most characteristic fish of Lake Chad are also identical with those of the Nile. These facts are now taken to indicate the existence of internal communication between the various systems at a comparatively recent period. Some peculiar forms common to Lake Chad and the Nile are the great perch of the Nile (*Lates niloticus*), which attains a length of 5 or 6 feet, the boliti (*Tilapia nilotica*), the long-snouted oxyrhynchus, the puffer or globe-fish (*Tetradon fakaka*), and various species of cat-fishes and mormyrus, the latter possessing slight electric powers.

The pariah dog and the ostrich are probably the only ^{Domestic animals.} indigenous animals which have been domesticated. All the other domestic animals, horse, ox, goat, sheep, one variety of dog, and fowls were introduced at an early date, and are probably to be traced through Egypt to an Asiatic origin. The horse is common in Hausaland and Bornu, but is much subject to fly disease to the south of the central belt of hills. A breed of small hill ponies is found on the Bauchi plateau, and a dwarf variety of horse is said to be reared in Ondo in Southern Nigeria. The Bornu ox is straight-backed with enormous upright horns and is apparently a variety of *Bos aegyptiacus*, the indigenous wild bull of north-eastern Africa. The Fulani ox is humped and smaller horned, and closely related to

the zebu or humped cattle (*Bos indicus*) of India. A large horned type of humped cattle is also met with as the result of interbreeding of the two varieties. All these thrive best to the north of the central belt of hills, but dwarf cattle, immune from fly disease, are found in Ondo, Ilesha, Ifon, and Iboland in Southern Nigeria, and in Bassa in Northern Nigeria. The prevailing colour of this peculiar variety is black and white, more rarely black or fawn-coloured. The legs are short, the head and body heavy, the horns small, and the fore quarters generally lower than the hind. They are similar to the stunted cattle of the Congo and Senegambia, and probably represent a dwarfed variety of *Bos aegyptiacus*. In the north the horse and ox are both used for riding and as pack animals, but not for draught. The sheep are wire-haired, maned, and long-legged, with short horns and long tails. Woolly sheep are unknown in Nigeria, although they are to be found in the neighbourhood of Timbuktu and in the oases of the Sahara to the north. A breed of large sheep with long hair and spiral horns growing out at right angles horizontally from the forehead is also found. The dwarf 'Guinea' goat is common everywhere in the south, small, plump, short-legged, with close hair and short horns. A larger breed, similar to the Syrian goat, is found in the north, hornless or with short horns, long neck, arched nose, long legs, long hair, and drooping ears. A thin-haired greyhound breed of hunting dog, introduced from Egypt, is found in the north, while the domestic fowl has spread through the Sudan from Egypt since 300 B.C. The civet-cat is kept in captivity in the north for the sake of the valuable perfume which it secretes.

Economic Conditions

Agriculture, food-stuffs, fruits. The inhabitants of the dense swampy jungle of the delta where the rainfall exceeds 100 inches per annum subsist mainly on a diet of yams. Small plantations of sugarcane and bananas are found round the villages, and maize is grown to some extent in the drier places. The farming

is generally of poor quality, and the natives grow only sufficient roots and grain for their own consumption. The belt of intermediate rains, a stretch of low ground extending from the western lagoons to the Cross River, is covered with a deep alluvial soil, densely populated, and largely under cultivation. The chief crops are (in order) yams, maize, and cassava, with small quantities of sweet potatoes, ground-nuts, and Guinea corn. So fertile is the soil that a few weeks of labour is sufficient to provide food for the whole year. As a rule no rotation of crops is practised. The land is simply cleared and cropped, and then usually allowed to lie fallow for five or six years. The people of Benin often plant their grain in partially cleared ground, but in the east on the Cross River cultivation is more careful, the earth being thrown up into loose mounds often 5 to 6 feet in height for the purpose of growing yams, maize, pepper, Guinea corn, pumpkins, &c., all of which are found planted on each mound. Fruit trees are not grown plentifully, and after planting are usually left uncultivated, the chief kinds being pine and akee apples, avocado pears, bananas, plantains, pawpaws, oranges, mangoes, and guavas.

The higher and drier ground which stretches northward to the Benue valley and over the Lagos hinterland, beyond the belt of intermediate rains, is particularly adapted for farming, and the climatic conditions are suitable in most places for the cultivation of cotton and fibrous plants in addition to the various grains. The numerous tribes which lie to the east of the Niger and to the north of the Cross River are said to be careful cultivators, but little is known of them. The Lagos hinterland is inhabited by the Yoruba peoples, who are more industrious and more intelligent than most of the other tribes of Southern Nigeria. Their principal crops are maize and Guinea corn, sweet potatoes and ground-nuts, cassava and yams, sugar-cane, native beans, pepper, onions, and tobacco. Fruits are abundant, but generally left uncared for. Continuous cultivation is unknown, the usual practice being to farm a piece of land for a few years

and then to allow it to return to a wild state for a long period. The use of manure is also unknown for any crops except onions and tobacco, both of which receive an application of wood ashes. The cultivation, however, is fairly deep, and this to some extent compensates for the non-employment of manure. The Yorubas are ignorant of artificial irrigation.

In Northern Nigeria the pagan tribes in the lower Benue valley and in the region of the confluence are industrious farmers, using no manure, but resorting to deep cultivation and raising from the fertile soil heavy crops of Guinea corn, maize, and yams. The Nupes of the middle Niger are less careful cultivators, while the pagan tribes of the central belt of hills are in many cases compelled to resort to terrace cultivation of the rocky slopes. Of all the tribes of Nigeria whose methods have so far been investigated, the Hausas are the most advanced, and round the city of Kano, where the population is most dense, cultivation has been continuous for a long period, the fertility of the soil being retained by an annual manuring with animal refuse and wood ashes. The method of cultivation is mostly shallow, and in many places the crops subsist almost entirely upon the manure supplied, the natural consequence being that the crops are small and frequently fail in dry seasons. Tillage is done entirely by hand, and all the fields for growing ordinary food-crops, with the exception of cassava, rice, and sugar-cane, are hoed up in long ridges which rise about 8 inches above the original surface and 10 to 12 inches above the lateral furrows. This system gives the farms the appearance of deep cultivation, but the appearance is deceptive, the ground being usually hard, unbroken, and untilled beneath the heaped-up soil. Large quantities of manure are therefore required to compensate for the shallow cultivation. Artificial irrigation by means of the Egyptian *shaduf* or dipping-beam is extensively practised around Kano and Zaria.

The staple crops of Hausaland and Bornu may be roughly classified as rainfall, irrigation, and swamp

crops. The first include the principal sources of food, such as Guinea corn, millet, maize, ground-nuts, cassava, and sweet potatoes. These are sown or planted at the beginning of the rainy season and are greatly affected by the distribution of the rains, whose insufficiency or irregularity in any district often leads to failure of the crops and famine. The irrigated crops are yams, onions, tobacco, pepper, and sometimes wheat; also cassava and sugar-cane in the northern districts. Wheat is also grown in places as a rainfall crop, but is practically confined to the country north of the eleventh parallel. The swamp crops are rice, colocasia, yams, and sugar-cane, the ground being specially prepared for each during the dry season. Fruits are scarce, and, with the exception of the tomato, are practically uncultivated. The commonest are pawpaws, limes, bananas, dates, and figs. Grapes were formerly grown at Katsina.

Nigeria owes to Egypt and the East all its domestic animals and its most important food-stuffs, and to the Portuguese slavers the majority of its fruits. It is probable that early Hamitic migrants brought with them into the Central Sudan the agricultural knowledge, the food-stuffs, and the domestic animals of the eastern nations. The absence of any knowledge of the plough, and of the use of the ox and the horse for draught, probably indicates that the stream of migration from Egypt to the Central Sudan was for some reason interrupted before these practices themselves had arisen in the early civilization of the Nile valley. The use of the *shaduf* or dipping-beam in Nigeria probably dates from the Arab invasion of North Africa in the seventh century A.D.

In Hausaland cotton has been cultivated from the ^{Cotton.} earliest times, and in the past cotton cloth formed one of the principal exports from Kano and Zaria to northern Africa by caravan. From Hausaland the knowledge of cotton spread southward to the Benue valley and to the Yoruba country in the Lagos hinterland, and thence to the Ibos of Asaba and to the Aros and Efiks of the Cross River. It appears to be unknown elsewhere in southern

Nigeria and in the central belt of hills. In course of time several distinct varieties of cotton have arisen in Nigeria, each particularly fitted to the soil where it is grown and able to resist the attacks of the local insect pests. In the south tall-stemmed varieties are commonly cultivated, which are usually prolific, yielding a lint whose fibre generally averages 1 inch in length. In the north a small-bolled variety with a short stem takes the place of the tall cottons of the south. The lint is of shorter staple and the plant is less prolific. Around Kano cotton is a manured crop, sown from July to September, harvested before the end of March, and often grown in small enclosures in alternation with cassava. Large cotton fields are not seen on account of most of the land being required for food-crops. In Yorubaland planting takes place in June, July, and August, and the harvest is gathered from January to April. For the most part the cotton is grown as a separate crop in succession to food-stuffs, although sometimes it is found associated with maize.

Cotton-
planting
experi-
ments.

West African cotton compares unfavourably with American varieties in colour, lustre, and length of staple, and the price obtained for it in the home market is equal only to that of 'middling American' grade. With the object of improving the quality and market value of the cotton, the government has distributed considerable quantities of selected seed, and the British Cotton-Growing Association has established stations throughout the country where experiments are being made in the naturalization of exotic cottons and in the hybridization of American and African varieties. The exotic cottons, however, are found to degenerate after the first generation and to be much more susceptible to the attacks of insect pests than the indigenous varieties, while a permanent hybrid, combining the lint of the best American kind with the hardiness and blight-resisting powers of the indigenous cottons, has not yet been produced. The high cost of local labour and the low market price of the ginned lint make the establishment of extensive plantations of indigenous cotton under white

supervision apparently impossible. Indeed, the experience of the British Cotton-Growing Association has shown that any such attempt is likely to prove unremunerative unless the work of general trader, farmer, and ginner be combined with that of grower. The British Cotton-Growing Association has abandoned the attempt to establish self-supporting plantations, and is concentrating its efforts upon the improvement of the indigenous varieties of cotton, upon the production of permanent and satisfactory hybrid forms, and upon encouraging the native farmer to introduce cotton into his ordinary field rotation.

A marked increase in the amount of cotton cultivated by the natives took place in Yorubaland after the opening of the Lagos-Ibadan railway and the establishment of a permanent market and ginnery at Ibadan. Ginneries are now also working at Oshogbo, at Lafenwa near Abeokuta, and at Illushi and Ogudu on the Niger. Practically all the cotton at present exported comes from Yorubaland and the river provinces of the Niger and the Benue. All the cotton grown in the northern districts is at present utilized locally, but with the extension of the railway to Kano and the gradual development of those regions which lie beyond the limit of the oil palm and the rubber vine, it is hoped that the natives will take to cotton-growing for export. The land and the climate of the northern states are suitable; the population is dense and industrious, but congested in the neighbourhood of the towns. Large areas of fertile land are uncultivated; but with the reoccupation of the country districts under the security of British rule and the improvement of means of transport, it is anticipated that Kano will become known in the markets of Europe, as she has long been in those of the Sudan, as the centre of the cotton industry in West Africa.

Tobacco is cultivated near Ibadan in Southern Nigeria and almost everywhere in Northern Nigeria. The crop is usually grown on low-lying land near water and is carefully irrigated. Cow manure, ashes, and house sweep-

Tobacco,
dye
plants,
fibres.

ings are always applied as fertilizers. The leaves are cured only by sun-drying.

In the Lagos hinterland, Ilorin and Kabba indigo is extracted from *Lonchocarpus cyanescens*, which occurs wild and is preserved when the ground is cleared for farms. In the north indigo is prepared from a species of *Indigofera*, which is grown and cultivated in small patches by the natives. Camwood, which yields a red dye, is obtained from various species of *Pterocarpus*, which grow wild and are preserved on the farms. Henna is used as a red dye when the other is scarce. It is obtained from *Lawsonia inermis*, which is regularly planted as a separate crop in the northern provinces.

Owing to the demand for ropes amongst cattle-keepers and canoe-men several species of *Hibiscus* are extensively cultivated throughout the country under the name of 'ramie'. In the north the crop is treated as carefully as a food-crop and considered valuable enough to irrigate. The prepared fibre is similar in appearance to Bengal jute and makes excellent rope.

Forest
products:
palm oil.

Palm oil, a thick orange-yellow or reddish liquid extracted from the nuts of the oil-palm (*Elaeis guineensis*), has formed an important article of diet throughout Yorubaland and the lower Niger valley probably from the earliest times. Its importance as an article of export dates only from the beginning of last century, when a trade in palm oil began to take the place of the former trade in slaves. The oil-palm is found generally throughout Southern Nigeria with the exception of the dense wet forests region of the Oban Hills. It grows most luxuriantly where the soil is generally moist, although swampy and ill-drained land is unfavourable. In its natural state it occupies open valleys with low undergrowth, but soon becomes established upon land which has been cleared of virgin forest. It diminishes in numbers in those regions where the climate becomes drier or where the land rises into rocky and mountainous country with a scanty soil. In Northern Nigeria it is found in Ilorin and Kabba, on the lower Benue and in the region of the

confluence, but further north it is only found in the vicinity of streams and is rarely seen to the north of Zungeru. The seeds or nuts, which are large and heavy, are distributed mainly by the agency of monkeys and frugivorous birds, such as the grey parrot. Several varieties of the oil-palm are known, varying in the thickness and relative proportions of pericarp and of shell and in the size of the kernel. The oil is derived from the outer fibrous pericarp and is extracted by the natives by means of boiling and maceration. The thin-shelled varieties have a greater proportion of pericarp, and therefore yield more oil. The palm kernels also yield an oil of better quality known as 'kernel oil', but this is generally extracted in Europe, the kernels being exported. The oil-palm is so abundant and so widely distributed that only a comparatively small proportion of the nuts is annually gathered.

Many varieties of rubber are prepared for export by the natives from the latices of various trees and vines indigenous to Nigeria. The most important of these and that which yields the best rubber is the African silk-rubber tree (*Funtumia elastica*), which is distributed throughout the forested zone of the country with the exception of the swampy parts. It is rarely found to the north of the confluence of the Niger and the Benue. The next in importance is the rubber vine, *Landolphia owariensis*, which has practically the same distribution as *Funtumia elastica*. The latices of a number of other plants are employed in the adulteration of good rubber. The natives have also discovered that a larger amount of latex than exudes naturally on tapping can be obtained at one time if the roots and stems are cut and pounded up, the resulting product being known as 'root rubber'. This wasteful method has led to the destruction of rubber vines and trees over wide areas, but the natives in many places are realizing their mistake and replanting rubber trees in many districts from which they had been practically exterminated. 'Paste rubber,' a sticky substance of the consistency of bird-lime, is derived from the vines

Carpodium hirsutum and *Landolphia florida* and other species which grow in the drier parts of Southern Nigeria and on the Niger banks. In the north various species of *Ficus* also yield inferior rubbers and guttas, the 'red Kano rubber' of commerce being derived from *Ficus platyphylla*.

Rubber-
planting.

Government plantations of Para rubber (*Hevea brasiliensis*) have been made in some of the wet districts and present a satisfactory appearance. None of them has yet fully matured, and in view of the uncertainty attending the introduction of exotic varieties of useful plants, the successful introduction of Para rubber is still in some doubt.

Other
forest
products.

Shea-nuts are the seeds or kernels of the fruit of *Butyrospermum parkii*, which grows wild in the northern forests and is preserved on land cleared for cultivation. The tree is characteristic of Northern Nigeria, although it is also found in the north of Yorubaland and eastward towards the Niger. The fleshy pericarp yields a white latex which coagulates into a product known as 'gutta-shea'. The kernel, upon suitable treatment, yields a thick oil or butter, which is used by the natives in cooking as a substitute for palm oil or ground-nut oil.

A kind of copal resin is collected in the southern regions from *Cyanothyrsus oblongus*, and is exported under the name 'Ogea gum'. In the drier northern regions of Kontagora, Hausaland, and Bornu, acacia trees of several species become numerous, and some of these produce gum, which is collected for export.

Hardwoods are abundant in the dense forest-belt surrounding the delta, the most valuable being mahogany and ebony. Ebony is found chiefly in the Cross River district, the sources being two species of trees of the genus *Diospyros*. Mahogany is abundant on the lower Niger, the sources being red woods of various genera of the natural order *Meliaceae*.

Silk-worms are found wild around Ibadan in the Lagos hinterland and in the Bauchi province of Northern Nigeria. The cocoons are collected and the silk carded

and spun into yarn by the natives and used in weaving and embroidery. The best silk is obtained from the cocoons of an *Anaphe* which feeds on the leaves of the tamarind tree in Bauchi province.

Cocoa plantations have been attempted in Southern Nigeria, especially to the north and north-east of Lagos. The climatic conditions are not particularly favourable to the cocoa-plant, which requires a sufficient supply of moisture all the year round and can survive only short periods of drought. The effect of the long dry season in the Lagos district is reflected in the frequent exhaustion, sterility, and repeated failure of the trees. More recently a number of small plantations have been made in the east, in Old Calabar and round Itu, and as the climatic conditions are there more favourable, more successful results are anticipated. As yet practically all the cocoa exported comes from the country behind Lagos.

Other
plantation
products.

Kola-nuts are especially valued in the Hausa states and throughout the Sudan, where their use is the same as that of betel-nuts in Asia. The chewing of the nuts is said to allay both hunger and thirst. The tree (*Cola acuminata*) is indigenous to the Gold Coast. In Southern Nigeria two species are cultivated in plantations by the Yorubas, Ibos, and Binis; but in the north the tree is seldom seen except on the west bank of the Kaduna river near its confluence with the Niger, where the plantations of the Emir of Bida are situated.

Coco-nut plantations are found on the Lagos coast and for some distance inland. At Badagry, the contents of the interior of the nuts are extracted, dried, and exported as copra.

Small quantities of gold, silver, copper, zinc, and lead are found in places throughout the country, but nowhere in sufficient quantity to repay European exploitation. Silver and lead (*galena*) occur together at Arofu on the middle Benue and in the Munchi country to the south, where the lodes have been worked by the natives, mainly for the sake of the *galena*, which is much used as a cosmetic throughout the northern countries. Gold and copper

Minerals.

ore occur in very small amount, and are nowhere worked by the natives. Various limonites and surface iron ores are extensively smelted by the natives in primitive fashion with wood charcoal. Tinstone occurs in and around the Bauchi plateau in Northern Nigeria and in the Oban Hills in Southern Nigeria, and in smaller quantities in various parts of the country. Only in Bauchi had a knowledge of tin-smelting arisen among the natives before the British occupation. The tinstone occurs there for the most part in river gravels, which are distributed over an area of about 9,000 square miles. Rapid exploitation of these Bauchi tinfields has taken place within recent years, and many prospecting syndicates are engaged in the location of payable deposits. The gravels vary much in their content of tinstone, and only a very few of the claims have reached the producing stage. The difficulty of transport has rendered the working of any but the richest deposits hitherto impracticable, but the completion of the railway now under construction into the heart of the tinfields will to a large extent remove this difficulty. There is also considerable prospect of lodes being found in future in the vicinity of the gravels.

The waters of a number of brine springs are evaporated for salt in the neighbourhood of Awe and Bomanda on the middle Benue and in various places in Southern Nigeria, to the north and west of the Cross River. Salt is also extracted in Bornu from the ash of a shrub, *Salvadora persica*, which grows in the vicinity of Lake Chad. The local supply of salt, however, is small and inadequate for the population.

In Southern Nigeria the most important mineral deposits are the lignites of Asaba and other districts and the sub-bituminous coal of the Udi highlands. The lignite deposits are believed to cover a large area east and west of the Niger, and the coal large portions of the Udi plateau. Great hopes are entertained of the value of these coals and lignites as a source of power not only to Nigeria itself but to the whole of British West Africa. Traces of bitumen and mineral oil have been found in

the Ijebu country near the Lekki lagoon, but although extensive boring operations have been carried out, no satisfactory results have been obtained.

Apart from such primitive occupations as agriculture Industries. and fishing, the inhabitants of the Niger delta and the southern forests practise few or no native industries. Earthen pots are made in several places, while a knowledge of iron is general. The people of Benin are noted for their skill in brass-work. Large numbers of the inhabitants are engaged in gathering and preparing the forest produce for European traders and transporting it to the factories. In the Lagos hinterland the Yorubas practise the arts of weaving, tanning, dyeing, and forging, and attempt a little cattle-rearing in the north. Large earthen jars are made in Abeokuta and elsewhere for the palm oil, indigo, and native liquor trade. The Kokandas and Nupes are skilful watermen, and each tribe has evolved a special type of canoe. The Nupes are also skilled in embroidery, in basket-work, in leather, and brass-work. The Hausas are skilful weavers, dyers, potters, leather-workers, blacksmiths, and general traders. Their great city, Kano, has been the centre of the cotton industry in the Sudan since the ninth century, the cloth being woven in narrow strips on small hand-loom and dyed indigo or magenta. The Kanuri of Bornu are mainly agriculturists, while the Fulani are in part cattle-keepers and horse-breeders and in part rulers and aristocrats. While there is considerable local demand for the various articles of native manufacture they are for the most part crude and badly finished and of no value for export.

From earliest times the Hausas have been the recog- Trade. nized traders of Nigeria and the Central Sudan, and well-defined trade-routes were early established from their northern cities into the countries of the surrounding tribes. Hausaland is particularly lacking in salt, and there is little doubt that it was the desire for salt which first stimulated the local industries of Hausaland and, added to their share of nomadic blood, first urged the Hausas to become the intrepid travellers and traders of the Sudan.

Great roads led from Kano, Zaria, and Sokoto south-westward to Nikki and Ilorin, where the cotton, cloth, leather-work, feathers, spices, and even cattle of the north were bartered for the salt and kola-nuts of the Lagos seaboard. Another main road led from Kano and Zaria southward to the Benue, where Kano cottons were again bartered for salt and *galena*. South-eastward through Bauchi lay the salt district of the upper Benue, eastward lay Bornu with its stores of salt around Lake Chad, and northward lay Asben and the country of the desert tribes with salt as abundant as cotton was rare. In all directions ran the great highways, established and frequented by the Hausa traders, and gradually, with the progress of civilization and of native arts, articles of other kinds were added to their stock in trade, until the men of Kano became the recognized carriers of the Sudan as the Arabs were of the desert to the north. Their method of transport was and still is by portage or by pack animals, donkeys, horses, and oxen, the traders travelling together in companies or caravans wherever the roads were considered unsafe. A considerable caravan trade, carried on mainly by Arabs, existed also between Kano, Kukawa, and Tripoli, whereby certain European commodities, such as sugar, coffee, and silk, became known in the Sudan, and Kano or 'Morocco' leather and ostrich feathers were placed upon the markets of Europe. With the establishment of European trading-stores on the lower Niger and Benue much of this transcontinental trade disappeared. The Hausa merchant could now obtain his luxuries and European goods independently of the Arab trader, and a stimulus was given to the southern river tribes, who were encouraged by Hausa and European alike to barter the products of the forest for native or foreign goods. The establishment of British rule throughout the land has been accompanied by a marked increase in internal trade, and where transport by steamer or rail has been provided the Hausa merchant has not been slow to avail himself of modern methods.

A great variety of goods suited to the native taste—

cotton goods, spirits, salt, rice and other provisions, silks, tobacco, sugar, cutlery, and hardware—are now imported into the country. On account of the products of native industry being unsuitable for the European market, the exports from Nigeria, with the exception of tinstone, are almost entirely forest or agricultural products—palm oil and kernels, rubber, cotton lint, cocoa, shea-nuts and butter, timber, gums, fibre, ground-nuts, benni seed, and tin oxide. The export of palm oil and kernels has been the mainstay of the trade of Southern Nigeria since 1900. Tin oxide is now the most valuable article of export from Northern Nigeria, but apart from minerals, shea-nuts, rubber, and palm kernels form the principal exports. Taking good and bad years together, the average export for periods of three years since 1905 shows a steady increase. By far the greater part of the oil and kernels exported is obtained from Southern Nigeria. The chief commercial uses of palm and kernel oil are for the manufacture of soap, candles, and glycerine.

Several of the so-called rubbers exported from Nigeria are of inferior quality and only of use for cheap manufactures. All kinds, however, seem to be marketable at a price which is remunerative to the exporter.

The greater part of the cotton lint exported from Nigeria is grown in the Yoruba country behind Lagos. The amount exported has shown a remarkable fluctuation during the last few years, owing mainly to an alternation of good and bad seasons. The greater attention being paid in certain districts to the growing of food-stuffs has also had an adverse effect upon the industry.

The export of cocoa from Southern Nigeria, and mainly from the Lagos district, is steadily increasing. There is a growing demand for shea butter in Europe for soap- and candle-making, as well as for the manufacture of vegetable butter, and the supply is at present inadequate. The trade in timber in Southern Nigeria has fluctuated much. Trees are only useful for felling in the vicinity of creeks and rivers whence the logs may be readily trans-

ported to the sea; and while new localities are constantly being opened up many of the earlier concessions are being rapidly worked out. Some trade in ostrich feathers and Kano leather is being encouraged in the north.

Communi-
cations.

The rivers have been in the past the main arteries of communication throughout the country, but in consequence of the great fall in the water-level between October and May, navigation is then only possible for shallow-draught stern-wheel steamers, launches, barges, and canoes. In the delta region every place of importance is easily reached by river steamers, and there is a regular service between Forcados and Lagos by lagoon. The Cross River is navigable in the season for 240 miles up to the Kamerun frontier. The Niger is navigable as far as Jebba, a distance of 400 miles from Forcados, the Benue as far as Yola, a distance of 480 miles above its confluence with the Niger. The Kaduna is navigable for 50 miles up stream to Barijuko, and the Gongola for 130 miles northward from its junction with the Benue. A railway of 3 feet 6 inches gauge from Lagos to Ibadan (123 miles) was completed in 1900. This line has since been extended by way of Oshogbo, Ilorin, and Jebba to Minna, 40 miles east of Zungeru and about 450 miles from Lagos, where it joins the Baro-Kano railway. This latter railway, which runs from Baro on the Niger via Bida and Zaria to Kano, a distance of 400 miles, was begun in 1907 and completed in 1911. A branch line is being built from Zaria eastwards to the Bauchi tin fields. Wide roads permanently cleared connect all the large towns and government stations throughout the country. Animal transport is much used in the north beyond the fly region, and a motor service has been instituted in places in Southern Nigeria. Off the main roads and railways all transport is still accomplished by portage. A regular postal service is maintained throughout the country, and a network of telegraph lines has been set up over the Protectorate and extended as far as Maidugari in Bornu.

Nigeria is particularly fortunate in possessing a large number of ports, of which the principal are, in order from

west to east, Lagos, Sapele, Warri, Forcados, Akassa, Brass, Bonny, Opobo, and Calabar. Akassa at the Nun mouth of the Niger was formerly the most important, but the bar has shallowed of recent years, and Forcados is now the principal shipping centre. Lagos is the poorest of all the major ports, possessing only a roadstead ; but on account of its importance as the principal railway terminus an attempt is being made to construct a harbour within the bar and to keep the channel open for large vessels by means of dredging. Port Harcourt, a site on the Bonny river, presenting the unusual feature of deep water beneath high banks, was designed in 1913 as the terminus of a railway to run by way of the Udi coalfield, the Benue river and the Bauchi plateau, and to connect with the existing system. A regular weekly service of steamers is maintained between Liverpool and Forcados ; Lagos, Calabar, and the other ports being served by smaller branch steamers from Forcados able to navigate the creeks and bars. Other steamers ply between the major ports and London and Hamburg. The internal telegraphic system is linked with Europe by cable from Bonny and Lagos.

The legal currency in general use is British sterling with a nickel penny and a nickel tenth of a penny. Cowries are, however, still largely employed, and barter is still the only means of exchange among the more primitive tribes. Banking is in the hands of the Bank of British West Africa.

Currency
and
banking.

Social Conditions

The population of Nigeria, which is estimated to exceed 17,000,000, includes a vast number of races and tribes, speaking different languages or dialects and varying greatly in degree of civilization. Ethnologically the affinities of many of the tribes are obscure, owing principally to miscegenation of various stocks. The fundamental type is that of the Negro, which is found in its purest form in the Niger delta and in the southern forests. The more cultured Yorubas of the Lagos hinterland are

Ethnology
and
culture.

also usually included in this category, as well as the almost innumerable primitive tribes which inhabit the central belt of hills. Next to them come the Negroid races of the northern savanas, of which the Hausas are the typical representatives, and which have arisen by the intermingling of Negro and Libyan stocks in varying proportions, but with Negro blood predominating. Finally, there is the Fula race of the northern states, a Libyo-Negroid transitional type in which Libyan blood and characteristics are distinctly in the ascendant.

There is little doubt that the Central Sudan was once peopled by Negro tribes who have been displaced and in part absorbed by successive streams of immigrants of Hamitic or Libyan blood from the east and north. The negroes fled for refuge into the central belt of hills and into the southern forests, while the newcomers settled on the fertile northern plains with the women of the conquered races as slaves and concubines. Thus arose in time the Negroid tribes who combine certain of the physical and mental characteristics of the negroes with the industry, endurance, and force of character of the more virile races of the north. It is only natural that the more primitive peoples should be found in the southern forests and in the central belt of hills, and that a gradual rise in the degree of civilization should be able to be traced in a general way from south to north and from the hills outward upon the plains.

Coastal
and delta
negro
tribes.

The principal of these are the Ijebus in the west around the lagoons and on the coastal plain, the Jekris on the lower part of the Benin River, the Sobos and Ijaws in the delta proper, and the Kwas and Ibibios between Opobo and the Cross River. As these are the southernmost tribes in the country, so they are also among the lowest in type, the most degraded of all being the Ibibios and the fishing folk who live amongst the creeks of the delta. It was these degenerate tribes who first came in contact with the European slavers, and they did not profit by the intercourse. They early became the middlemen of the slave and gin traffic, and afterwards of the palm-

oil trade with the interior. With the opening up of the hinterland their carrying trade is gradually disappearing. Their taste for liquor remains, with the result that the prevalent diseases of the delta are greatly encouraged while the population has become stationary or is decreasing in numbers. In internal organization these tribes have not progressed further than the stage of simple Father rule.

The negroes of the southern forests include the Efiks and Ekois of the Cross River, the Ibos and Aros to the east of the Niger, the Munshis and Okpotos to the south of the Benue, the Bassas and Kokandas in the region of the confluence, and the Igaras and Binis to the west of the Niger. These tribes are all pagan or fetish worshippers, but of a superior type to the Ibibios and Niger delta tribes. They vary greatly in culture and internal organization. The Efiks of the Cross River have come much in contact with Europeans, and have adopted many European customs and acquired a certain amount of European learning. The secret societies 'Egbo' and 'Idiong' are Efik institutions, and combine a kind of freemasonry with trading and law-enforcing aims. The Ibos occupy a large tract of country between the Niger and the Cross River just above the delta, and extend also to the west of the Niger behind Asaba. They are an intelligent, cleanly, industrious and self-reliant race with a strongly imaginative and even artistic temperament. Little is known of the Munshis and Okpotos beyond the fact that they are independent and warlike tribes. The Bassas and Kokandas are famed as agriculturists and watermen respectively. The Binis of the Benin territory already possessed before the British occupation a culture rare among purely negro tribes. They had developed the arts of brass-working and ivory-carving, and by careful organization had become one of the most powerful states in West Africa as early as the fifteenth century.

Negro
tribes of
the
southern
forests.

The religions of all these peoples are based on spirit and ancestor worship, and here and there traces of an older purer form of worship are to be found upon which,

through the influence of environment, have been grafted the complicated superstitions of the modern juju and fetish worship. Their languages are many and varied, and two of them, Efik and Ibo, have been reduced to writing. A peculiarity common to them all is a tendency to monosyllabism, whereby the same word is used to express different meanings according to differences in the tone or inflection of the voice when it is spoken. With regard to internal organization, the commonest form of native government to the east of the Niger is the House-Rule system, according to which a tribe is divided up into a number of independent Houses consisting of the Father or Ruler of the House, his offspring, relations, pawns, slaves, and also strangers on terms. Out of this system has developed among some tribes the Clan form of government, under which related Houses have come together and chosen the Father of the most important family as Chief or Father of the Country, this Chief being assisted and advised by a Council of Elders chosen from the heads of various Houses. No people east of the Niger has developed further than the Clan system. The Aros, however, a branch of the Ibo people, were developing a kingdom when the British arrived, their power being based on the possession of a particularly powerful fetish known as the 'Long Juju'. To the west of the Niger the Igaras have developed a wonderfully organized feudal system, while the Binis had established an ascendancy over all the surrounding peoples and had reached the Kingdom stage of government as early as the fifteenth century. The principal towns of these forest tribes are Benin and Owo in the south-west; Warri and Sapele on the southern creeks; Asaba and Onitsha on the lower Niger; Calabar, Creek Town, and Itu on the Cross River; Idah on the Niger below the confluence; and Lokoja at the confluence of the Niger and the Benue.

Yoruba
tribes of
the Lagos
hinter-
land.

The Yoruba-speaking tribes are of true negro stock, with some Hamitic or Libyan blood and traditions of an Oriental origin. The people are intelligent, industrious, and law-abiding, and before the British occupation had

attained a higher degree of civilization than any of their kindred tribes to the east. Their former powerful empire, of which the king of Oyo was the nominal head, broke up latterly into a number of more or less independent states, the capitals of which, Abeokuta, Ibadan, Ilorin, Oyo, Ijebu Ode, and Ondo, are now the largest cities in the country. They possessed in the past a sound system of laws which has made them the most tractable of all the tribes of Southern Nigeria under British rule. They possess also a special aptitude for various handicrafts, and rapidly become skilled engineers, carpenters, masons, and bricklayers. Like the negro tribes to the east, they are to a large extent pagan, their religion being a mixture of fetish and ancestor worship. Christianity claims a number of adherents through missionary effort, while a veneer of Muhammadanism is fairly general in the northern portion of Yorubaland, which was overrun by the Fulas in the beginning of the nineteenth century. Their language ranks next in importance to Hausa and Mandingan in West Africa, and has been reduced to writing. Monosyllabism, produced by phonetic decay, is a pronounced characteristic, and, as in the case of the kindred languages to the east, has given rise to the general use of the principle of intonation.

The tribes who inhabit the central belt of hills are extraordinarily numerous. Some of them are well defined and occupy a considerable area, like the Gwaris of Zaria and Nassarawa, the Jarawa of Bauchi, and the Marghi of Bornu. Others, however, are much restricted both in numbers and in territory, and represent the relics of former more extensive tribes who have taken refuge in the hills. Their ethnological and linguistic characters have been little studied. Many of these tribes, hitherto classed as negro, are undoubtedly of a mixed type, while the speech of the Kibyen peoples of the Bauchi plateau is full of clicks and gutturals, a feature which may indicate some early admixture of Bushman blood. All these tribes are primitive pagans, but the influence of the varying character of the environment may be detected.

The
central
negro
tribes.

Those peoples who, like the Gwaris, inhabit the less rocky and more favoured regions are well clad, industrious, and peaceable; while those who, like the Angass and Tangale, live amongst barren rocks and boulders are naked, savage, intractable, and given to cannibalism and other inhuman practices.

Negroids. The principal negroid races of Nigeria are the Nupes, Hausas, and Kanuri, located respectively on the middle Niger, in Hausaland, and in Bornu. The Nupes have probably been displaced by the Hausas, for small Nupe settlements are still found scattered through the northern states. As a race they are of fine physique, and noted watermen and agriculturists. They practise many useful arts in their towns and villages, Bida the capital being noted for its embossed brass and copper work. They possessed an ancient and very interesting constitution, of which the leading features were adopted by the Fulani at the time of the conquest.

The Hausas are the most important nation of the Central Sudan, and owe their virility to a strong crossing of Hamitic blood. They are a powerful, strongly built, and athletic race, with a black skin, but with features much modified by their descent. As a race they are peaceful and industrious, with no great political ambitions, but with the trading instinct strongly developed. They live in farmsteads or in cities which they have made centres of trade, the principal of these being Kano, Zaria, Bauchi, Katsina, Katagum, and Hadeija. Kano is the great emporium of trade for the Central Sudan, and is connected with Tripoli by a caravan route across the desert. All the cities are walled, and many of the houses are built with flat mud roofs in Oriental style. Originally Hausaland was divided up into a number of semi-independent states, of which first one and then another obtained the ascendancy. Trading and slaving settlements were formed as far south as Nassarawa, Muri, and Yola on the Benue. In the beginning of the nineteenth century the government was seized by the Fulas, who, under Sheikh Othman dan Fodio, founded the Fulani

empire, with the capital at Sokoto in the north-east. Previously to this the Hausas possessed an excellent code of laws which was retained by the conquerors. The Hausa language, with its rich vocabulary and its simple construction, is the *lingua franca* of the Sudan, and the only language in tropical Africa which has been reduced to writing by the natives themselves, the script employed being a modified Arabic. Muhammadanism is the professed religion, but the observance of the rites and ceremonies is usually delegated to the mallams or priests. The great majority of the people are little removed from paganism, and have a profound belief in the efficacy of charms and *jujus*.

In Bornu the ruling race is the Kanuri, who in the Middle Ages possessed a well-developed civilization and an extensive empire round Lake Chad. They were noted horsemen, and in war both the persons and the horses of the chiefs were clad in mail. They successfully resisted the Fulani invasion, but their capital Kuka was sacked and their empire finally destroyed by the adventurer Rabch in 1900. The principal towns in Bornu are now Maidugari, Gujba, and Mongonu. The rulers profess Muhammadanism, but the greater part of the people are still pagan.

The Fulas or Fulani, who are settled as rulers and aristocrats throughout Hausaland, Ilorin, Nupe, Muri, and Yola, are of a superior type to any of the other races of Nigeria. They are typically reddish brown or light chestnut in colour, with oval faces, delicate lips, straight or aquiline noses, and smooth hair. Originally a pastoral people, they entered Hausaland as wandering herdsmen and cattle-keepers, and a section of the race, the Bush Fulani, disdaining a settled life, preserves its nomadic character. As the result of a religious war in the beginning of the nineteenth century, the Fulani captured the government of the Hausa states and settled in the towns as the ruling caste. They intermarried with Hausa and slave women, and lost the purity of type which is still characteristic of the Bush Fulani. They developed also

Libyo-
Negroid
transi-
tional
type.

a love of luxury, pomp, and finery, foreign to their original pastoral existence. Being possessed of great intelligence and strength of character, they made at first excellent rulers, stern but patient and just. They were devout Muhammadans, and established mosques and schools in all the principal towns. Latterly, however, they degenerated into slave-raiders and extortioners, and their defeat by the British in 1903, with the accompanying establishment of a just and honourable government, was gladly welcomed by the peasantry and the trading communities. The Fula language, like the race itself, occupies an intermediate position between the Negro and the Hamito-Semitic groups.

Government.

The two Nigerias were united in 1912, when Sir F. D. Lugard was appointed the first Governor, with headquarters at Lagos. For purposes of administration Southern Nigeria is subdivided into three provinces—western, central, and eastern—each province being under the supervision of a District Commissioner and several assistants. Northern Nigeria is subdivided into 13 provinces—Ilorin, Niger, Kabba, Bassa, Nassarawa, Muri, Yola, Kontagora, Zaria, Bauchi, Sokoto, Kano, and Bornu—each province being administered by a Resident and one or more assistants. The mode of administration varies greatly in different parts of the country. In the Muhammadan states which possessed a judicial class, a code of laws, and a central government before the occupation, the ancient administration has been revised and purified but left largely in the hands of the natives. Under the supervision of the Resident, the Emir and his native councillors, judges, and police are responsible for the whole administration of the province. The total amount of the taxes collected in each province is divided into two parts, one of which forms the Government share and is credited to general revenue, while the other is paid into the local Beit-el-mal or native Treasury and is used to pay the fixed salaries of the Emir, judges, and other officials, to defray the cost of public works, and to establish a reserve fund which could be used when necessary, owing to failure of the crops, to

remit a portion of the annual taxation. Among pagan tribes such as the Yorubas and Binis, who formerly possessed a constitution and a central government, a similar policy is pursued as far as possible, such of the native laws and customs being retained as are not incompatible with British ideas of natural justice. Greater difficulties are met with in the administration of the more primitive tribes, such as those of the southern forests and the central belt of hills, whose internal organization has not progressed so far as the establishment of a central authority. In such cases the task of the political officers is to suppress tribal feuds and savage customs, to dispense justice, and to foster a national sentiment by encouraging friendly intercourse and co-operation between hitherto hostile villages and towns. Fortunately the prestige of the white man is nowhere greater than among these primitive tribes when once they have been subdued, and it is remarkable how quickly they respond, after ages of stagnation or retrogression, to the stimulus of new ideas and of an altered environment. The general policy which is everywhere kept in view by the British administration is that of ruling through and with the native rulers.

The military force of the country, which supplies patrols and escorts and takes the offensive in the case of hostile tribes, consists of two native regiments of the West African Frontier Force, under British officers specially detailed for service in Nigeria. A native police force is distributed throughout the provinces, and is engaged mainly in the investigation of crime, arrest of criminals, suppression of slavery and illicit liquor traffic, and in court and administrative duties.

Customs duties on spirits, cotton goods, and tobacco account for some three-quarters of the total revenue of Southern Nigeria, the remainder being made up of railway and postal charges, court fees, licences, rent of government properties, harbour dues, &c. The importation of liquor into Northern Nigeria for native consumption is prohibited, and consequently the customs duties yield only a small part of the revenue. The

Revenue
and ex-
penditure.

greater part is derived from a system of direct taxation, which takes the form in some provinces of an individual income tax and in others of a farm, hut, or poll tax according to the local conditions. The inhabitants of the Muhammadan states were accustomed to direct taxation before the British occupation, and the system has been retained in a revised and more equitable form by the new administration and extended even to pagan communities. The revenue and grants-in-aid of Northern Nigeria during 1910 were expended mainly upon railways and other public works, the military and police forces, and administrative, medical, and transport services.

Educa-
tion.

In Southern Nigeria the various missions which are at work throughout the country have had schools established for a number of years, providing primary and secondary education and technical instruction. A system of government and assisted schools has more lately been organized. In connexion with a number of these schools, and in addition to the ordinary educational subjects, technical or manual instruction is given in agriculture and in such subjects as carpentry, bricklaying, coopering, sewing, cooking, and laundry work. The principal schools for the training of teachers are the Hope Waddell Institute in Calabar and King's College, Lagos. In Northern Nigeria various European missions have been at work for several years among the pagans on educational lines with considerable success. A government school for the sons of chiefs and 'mallamai' or Moslem scholars has recently been opened at Kano, and has had a favourable reception amongst the inhabitants of the northern states. The scheme of instruction is very similar to that in the Southern Nigerian schools, with variations to suit the local conditions. Native Muhammadan schools exist in almost every town, but the instruction consists merely in the repetition and memorizing of portions of the Koran.

Public
health.

The native death-rate from all causes is known to be high, and with the object of reducing it increased attention is now being paid by government officials to the sanitation, drainage, and water-supply of native towns. Dysentery,

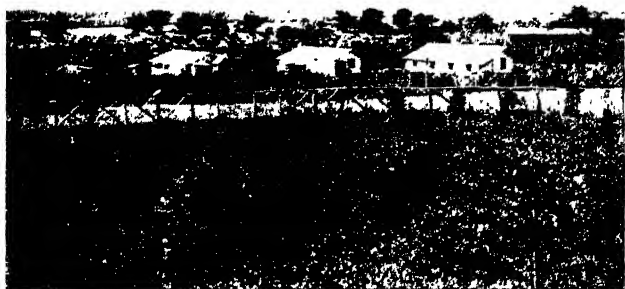


PLATE XXV (a). PART OF LOKOJA, FROM BASE OF MOUNT
PATTI, OVERLOOKING THE NIGER



PLATE XXV (b). ENTRANCE TO A NIGERIAN VILLAGE,
ILLORIN PROVINCE

(Phots. Major A. J. N. Tremearne)



PLATE XXVI. JAMESTOWN, ST. HELENA (Page 467)

(Phot. W. M. Spooner)

malaria, pneumonia, small-pox, leprosy, and venereal diseases are everywhere common. In Northern Nigeria leprosy and small-pox are especially abundant throughout the Muhammadan states, and isolation measures are adopted as far as possible. Several cases of sleeping sickness have been found in the Benue valley, but the disease shows no sign of becoming epidemic. Among Europeans resident in Nigeria malaria and blackwater fever are the prevalent diseases. The percentages of invalidings and of deaths from all causes have been much reduced of recent years, a fact which points to a better understanding of the climatic conditions and to more successful adaptation to the tropical environment. The conditions of life on the coast have been much ameliorated by the cold-storage system of supplying fresh meat and vegetables. In the interior the improved conditions are largely due to the increased facilities for communication, to precautions against the mosquito, to moderation in the use of stimulants, and to the encouragement of games and physical exercises among the more sedentary population of the cantonments.

[See Colonial Office *Reports* and other official publications, and for general Bibliographic and narrative matter the extensive list of works dealing with individual journeys. Among recent works there may be mentioned in addition (the place of publication being London): A. F. Calvert, *Nigeria and its Tin Fields*, 1912; R. E. Dennett, *Nigerian Studies, or the Religious and Political System of the Yoruba*, 1910; C. Dudgeon, *The Agricultural and Forest Products of British West Africa*, 1911; J. D. Falconer, *The Geology and Geography of Northern Nigeria*, 1911, and *On Horseback through Nigeria*, 1911; A. G. Leonard, *The Lower Niger and its Tribes*, 1906; Lady Lugard, *A Tropical Dependency*, 1905; E. D. Morel, *Nigeria: its Peoples and its Problems*, 2nd ed., 1912; *Affairs of West Africa*, 1902; C. W. J. Orr, *The Making of Northern Nigeria*, 1911; P. A. Talbot, *In the Shadow of the Bush* [the Ekoi], 1912; N. W. Thomas, *The Ibo-speaking Peoples of Nigeria*, 1913; A. J. N. Tremearne, *The Niger and the West Sudan*, 1911, and *The Tailed Head-hunters of Nigeria*, 1912; also in the *Geographical Journal*, J. Parkinson, 'Geological Survey of Southern Nigeria,' January, 1907; G. T. Basden, 'Notes on the Ibo Country,' March, 1912; A. E. Kitson, 'Southern Nigeria', January, 1913.

A detailed topographical survey is in progress in Southern Nigeria, the results of which will be published on the scale of 1 : 125,000. For Northern Nigeria 62 sheets on the scale of 1 : 250,000 have been published from route sketches, &c., by officials, while boundary commissions have surveyed some 2,000 miles of frontier. See also War Office map on scale of 1 : 1,000,000.]

CHAPTER XX

WALFISH BAY

By H. O. BECKIT

Position
and
extent.

THE Walfish Bay territory, which now forms a small enclave in what has been German territory since 1884, owes all its importance to the fact that it is the only reasonably well-placed, good natural harbour in a very long reach of the generally sand-buried coast of south-west Africa. It lies just inside the tropic, and extends about 30 miles north and south (less at the coast), with a depth inland of 10 to 15 miles. All of it is, in fact, contained within the desolate littoral belt lying in front of the Damanama highland which divides the Kalahari basin from the South Atlantic ocean.

Physical
features.

At Walfish Bay this is a low desert region, its surface diversified only by greater and lesser sand-hills of shifting form determined by the winds. Along the shore these rise as coastal dunes 30 to 100 feet high ; within 3 miles of the sea they reach heights of 300 and 400 feet. The coast has undergone recent uplift, and it has been argued that some of the hills are the eroded remnants of sandbanks thus raised out of the sea. The flat, gently inclined plain of the arid Namib veld, with its salt pans and kopjes, begins beyond the sand-dunes, usually a little short of the British frontier. Underneath the sands are old crystalline rocks, visible mostly in patches at low water along the shore, and in the kopjes.

Across this sandy tract run wide, flat-bottomed, generally dry valleys leading to the sea from the less arid dissected highlands in rear, towards which they form the natural routes. One of these occasional water-courses, the Swakop or Tsoakhub, forms the northern boundary, and runs for a month or two each year : another, the Kuisip (Kuisseb, or Khosib), still at times overflows into a lagoon at the head of Walfish Bay, but

its normal course is through the sandhills further south. These floods are said, without much exaggeration, to occur only once in 10 years. The rivers are highest about February or March. At other times, though brackish water may sometimes be had by digging in the deep sand choking the valleys, the whole area is virtually waterless save for a small patch in the extreme south-east, where there are perennial springs, and even a little cultivation. At the small settlement on Walfish Bay drinking water is obtained by condensation; what was needed for Europeans used actually to be brought from the Cape.

The climate is ruled by the cool Benguela current and ^{Climate.} by south-westerly winds, usually freshening in the afternoon, which bring to the coastal lowland little or no rain (annual average, less than one-third of an inch), but very frequent mists and night dews; cloudiness and atmospheric humidity are lowest in June. During clear still weather it may be very hot; but the nights are uniformly cool or even cold. The mean annual temperature is low for the latitude (little over 60° F.); and its mean annual range, relatively slight, though actual extremes may drop below 40° or rise beyond 95°.

Away from the valleys, and often even in them, there is exceedingly little ^{Vegetation and fauna.} vegetation. The most important plant is the spiny but leafless *nara* gourd (*Acanthosicyos horrida*) of the sand-dunes, which it helps both to form and to fix: it is a creeper, sending down immensely long roots to ground-water and thus becoming independent of mere surface moistening by dew. On its fruit the small native population of Topnaar Hottentots lives for months at a time. The true land fauna is correspondingly scanty; that part of it which once had some commercial importance (elephants and ostriches, for example) really belonged to the hinterland, and has been largely killed off.

The northward current of cold water from higher latitudes, already mentioned as prevailing along the coast, carries food for huge shoals of fish, as well as for whales. The southern right whale has grown rare; the humpback

(*Megaptera longimana*) less so. The bay received its name originally from its old fame as a whaling station. Attracted by the shoals of fish, swarms of birds—gulls and the like, pelicans, and penguins—and also of seals frequent the coast and certain islets fringing it to the southward. Penguin Islands, strung out all the way to Angra Pequena (Lüderitz Bay), which were annexed in 1867 and remain British territory, provide guano, in decreasing quantity. Flamingo visit the Walfish Bay lagoon in summer.

The har-
bour and
trade.

The harbour of Walfish Bay opens only to the northward, whence winds are rare: it is protected by a low sandy promontory five miles long, which is still being built out by the northerly trend of wind and currents. Curious occasional mud-bursts, giving off poisonous gases that kill enormous numbers of fish, occur here; they are usually attributed to volcanic eruptions, but may be due to submarine escapes of ground-water facilitated by the coastal uplift.

The ample anchorage within the bay affords shelter at need to steamers trading to the open roadstead of Swakopmund; but in spite of trade being free, and the building of a light railway to the frontier, only a trifling proportion of the growing trade to and from the German interior makes use of Walfish Bay. There is a small export of hides, and a not much larger importation of food-stuffs for the settlement and of trade goods for the interior.

Adminis-
tration.

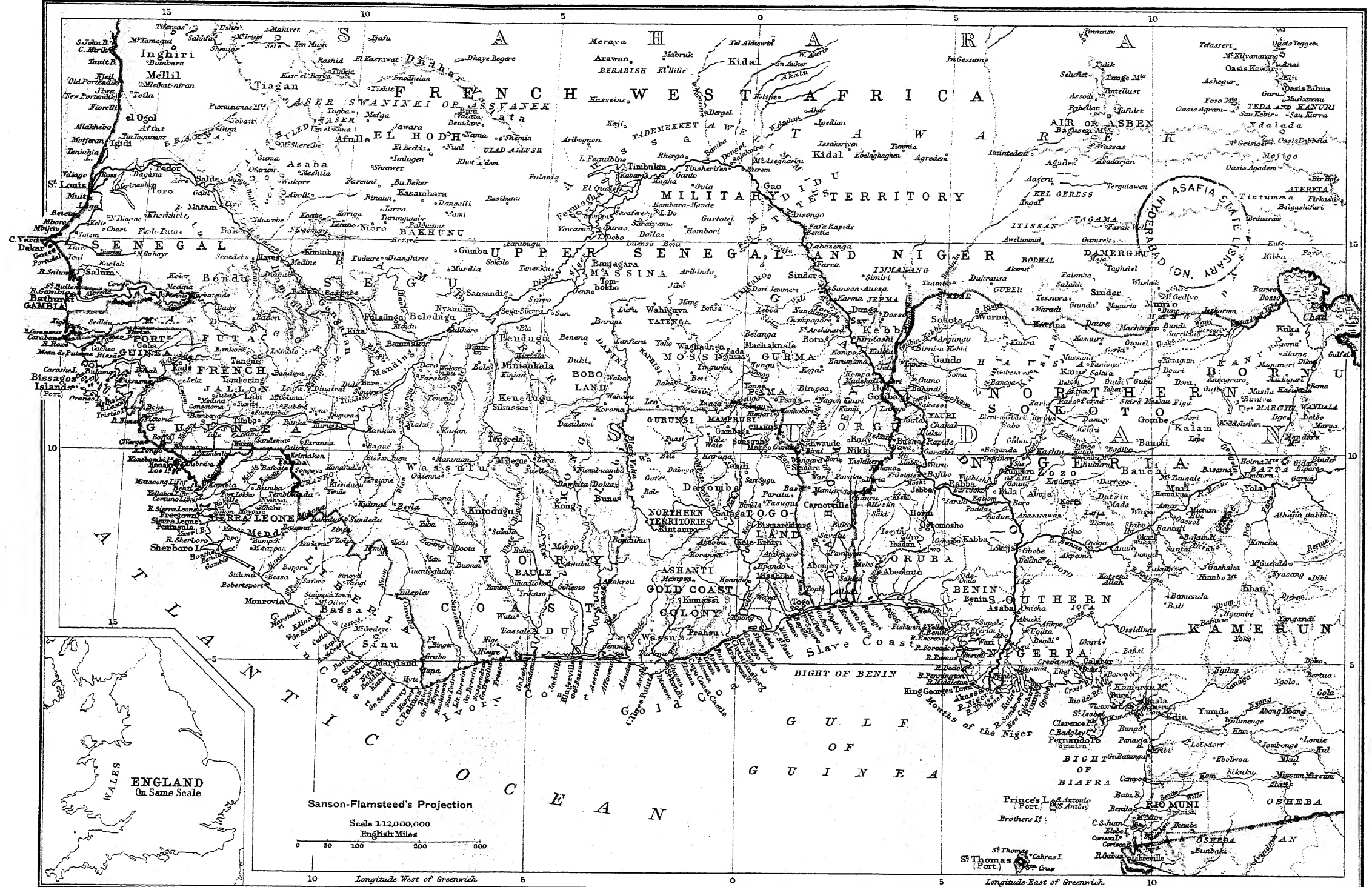
Walfish Bay was annexed by the British in 1878, and has been governed since 1884 as a part of Cape Colony by a resident magistrate; the settlement also contains one of the long-established Protestant missionary stations, which were amongst the earliest of European influences north of the Orange river.

Books
and maps.

There is no good special literature on Walfish Bay, but a large one on German South-West Africa as a whole. The sources to date were well summarized by Schliehter in the *Scottish Geographical Magazine* for September and October, 1891; a recent standard work, with maps and very good illustrations, is *Das Deutsche Kolonialreich*, edited by Meyer (Leipzig and Vienna, 1910); South-West Africa is treated by Schultze in vol. II.

Admiralty charts nos. 1806, 632 and 629; part II of the official *Africa Pilot*, and War Office 1: 1,000,000 map of Africa (I.D.W.O., no. 1539), sheet 119.

BRITISH POSSESSIONS IN WEST AFRICA



CHAPTER XXI

BRITISH ISLANDS IN THE SOUTH-EAST ATLANTIC

(TRISTAN DA CUNHA GROUP, ST. HELENA,
AND ASCENSION)

BY H. O. BECKIT

SOUTH of the Equator and east of 20° W. long. the surface of the Atlantic is broken in three places by tiny patches of British territory, the only true oceanic islands in this quarter of the ocean north of 50° S. lat. They have some features in common, and also afford some contrasts that can be conveniently treated together.

Originally discovered in the early years of the sixteenth century by the Portuguese, and then all uninhabited, they stand on or close to the great axial rise in mid-Atlantic that divides its greater depths in two. All are remnants of volcanic masses erupted on the ocean floor, and in part worn down to submarine platforms which sometimes lie at astonishing depths. What still remains above sea-level is rugged, as a result of dissection of original mountain forms, and cliffed by recent or contemporary wave action. No metamorphic or sedimentary rocks, suggesting old continental connexions, exist.

Oceanic climate, with its relatively moderate and even temperatures, is a common characteristic ; but in spite of the small size of the islands, which together do not equal in area the county of Rutland, there are considerable local variations due to altitude. Temperature throughout is unduly low for the latitude, as all the islands are washed by comparatively cool water brought from higher latitudes.

Another remarkable feature common to all the islands is the rollers, which for days at a time beat heavily on shores not then facing the winds, and occur most frequently during the season, say from December to

April, when local winds are least high. These troublesome visitors, dangerous to boats and even to shipping, are now known to be due to the passing of distant storms, of which they are the swiftly travelling after-swell. In this way all sides of the islands—not merely that to windward—are attacked by a heavy surf.

Otherwise there is marked contrast between Ascension and St. Helena, which lie full in the track of the south-east trade-winds, and would be wholly arid were it not for their strong relief, and the southern isles, equally exposed to the rainy, blustering westerly winds of the Roaring Forties. There is a gradual increase from north to south in rainfall and in profusion of vegetation, but hardly in variety of flora; comparative poverty of the less easily transferable fauna is only natural in small islands thus isolated. Rainfall is moderately periodic in the northern, but more or less year-long in the southern islands, which lie just between the limits of regular and of occasional extension towards the Equator of drift-ice, and also of snowfall (at sea-level). They are thus essentially in the transitional, so-called 'temperate' zone, while St. Helena and Ascension are nearly as typically intertropical.

TRISTAN DA CUNHA

The Tristan da Cunha group comprises the island of that name, rising conically to a height of 7,000 or 8,000 feet and generally snow-capped, Nightingale and Inaccessible Islands about 20 miles away, and the outlying Gough (better Alvarez) Island. Landing is difficult, but possible at a few little coves in the lofty cliffs, and somewhat facilitated by a breakwater of kelp growing off-shore in depths down to 15 fathoms; but only Tristan itself, which is twice as large as the rest put together, is regularly inhabited. Its people are an almost unique race, descended from a handful of men of the British garrison maintained here during Napoleon's captivity at St. Helena, and since then forming an isolated patriarchal society governed by one of themselves. The settlement is on an under-

cliff on the north-west side, with small patches of cultivation, mostly of potatoes ; of these and their limited livestock they export some occasionally to Cape Colony, but trade most to passing ships' companies in exchange for flour, tea, sugar, and clothing. They have over and over again distinguished themselves by rescuing and caring for shipwrecked crews.

Before the days of steam, Tristan da Cunha lay not far off the outward passage between Europe or New York and the Cape, and in the middle of the eighteenth century there was more whaling and sealing in these waters. With the reduction in the number of vessels calling, the island is less than ever able to support any growth of its small population, and there has been a good deal of emigration ; it has been repeatedly proposed to remove the whole of the people.

The heavy rainfall, probably everywhere over 40 inches annually, supports a dense growth of tussock grass (*Spartina arundinacea*) in the lower parts, of wind-stunted woodland up to 2,000 feet, and of ferns (including a tree fern, *Lomaria boryana*) and mosses in the deep glens ; on the main island few trees larger than bushes remain. The summits are bare of vegetation and rocky, and several distinct craters are said to contain small lakes. Penguins are almost the sole indigenous animals, but rats, somehow imported, are a pest.

ST. HELENA

The British occupation of St. Helena was begun in the middle of the seventeenth century by the East India Company, in order to form a revictualling station for ships on the homeward voyage. Though it lies near what is now the direct Cape route both outward and homeward, so that some steamers call, and the island has come to be used as a convenient telegraphic cable station, the opening of the Suez Canal has dealt it an irremediable blow.

Its forbidding cliffs are scored with deep ravines, cut by short streams fed by the upland springs. Great part

of the land lies more than 1,500 feet above sea-level, rising 1,000 feet higher in a great crater-like amphitheatre which lies open to the south-east coast ; but there is little level ground, except some high plains in the north-east where first the great Napoleon, and more recently Boer prisoners of war, who doubled the population for a time, lived in captivity. Here on the upland the annual rainfall reaches 40 inches, and the mean monthly temperature ranges from 65° to 75° F., but below on the leeward side, where the partially sheltered anchorage off Jamestown lies, precipitation is only about one-eighth as heavy and the thermometer registers about 10° higher all the year round.

Of the three natural divisions of the surface—(1) a coastal zone of low valley-bottoms and slopes, with intervening narrow spurs, (2) upland, and (3) mountain—the first is now practically barren save for plants like prickly pear, and the native flora has either disappeared or else been driven into the third division by the imported plants, bushes, and trees. The ebony (*Dombeya melanoxylon*) and redwood (*D. erythroxylon*), for example, which used to form characteristic woodland, have vanished since all the young trees were destroyed by the imported goats, which, in the days of the Indiamen, were held by authority to be of greater value than trees ; but the washing away of the often clayey soil that followed, with its accompaniment, the drying up of springs, has done permanent injury. When discovered, the island is said to have been clad in green right down to the sea, but now at least two-thirds of the area are unfit for tillage. The present woods, of imported European or Australian species, show a tendency to gain ground down the valleys. There are many small cultures, none of great importance : maize, for example, is grown, but only for use as a green fodder, and the staple food of the people is fish and imported rice. Most of the land that is utilized is under grass, and European domestic animals have superseded the indigenous fauna : cattle and sheep are exported to Ascension.

The population, of mixed European, African, and East Indian race, and partly descended from emancipated slaves, has developed no appreciable natural industry or export trade since the shipping that was its stand-by ceased to make frequent and long calls. Many attempts to encourage such industries have been made under the Crown Colony government, but they have either failed like the cinchona planting, or remained more or less experimental, like the fibre production from an aloe (*Furcraea gigantea*) or from New Zealand flax, and the fish-curing. Fish, notably albacore, and a small mackerel, continue to be caught with lines; and traps are set for small lobster-like crustaceans, locally called 'stumps'. Lace-making as a home industry for women has been moderately successful, but it is not self-supporting. There is a steady stream of emigrants, largely women, to South Africa, and the population on the whole slowly declines.

The island is administered under the Colonial Office by a governor who is advised by a small executive council: legislation is either by Order in Council from England or by ordinance on the governor's sole authority. The small military garrison was withdrawn in 1906, but a marine detachment replaced it in 1911.

ASCENSION

Ascension has a very irregular surface, but shows typical relief of an extinct volcanic region at least as clearly as any of these Atlantic islands. Its climate is similar to that of St. Helena, but hotter, and in particular drier; consequently the initial forms due to eruption are generally less weather-worn. A whole series of old cones stands above an uneven, ridged lava-field which forms, e. g., the rough channelled country sloping directly to the northern and southern coasts; and the frequently rich but always thirsty soil is made up of decomposed lava, volcanic ash, or dusty pumice; it is often ferruginous. The summits cluster about the greater mound called Green Mountain, rather south-east of the centre,

which rises to a height of nearly 3,000 feet. It seems as if this were the youngest, just as in St. Helena we have the oldest, of these dead oceanic volcanoes.

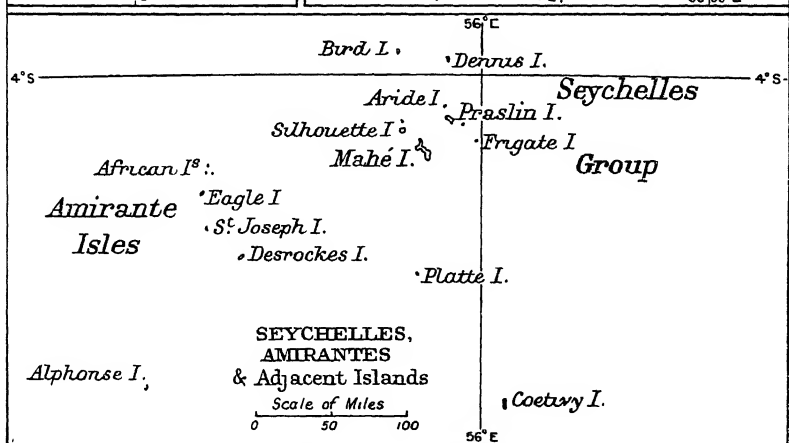
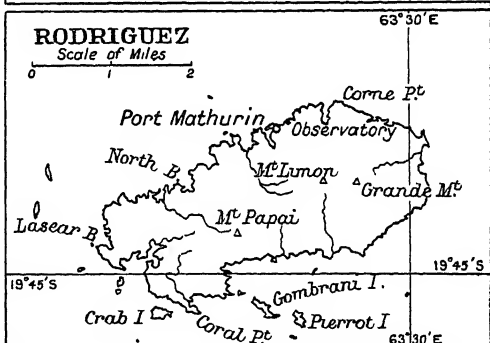
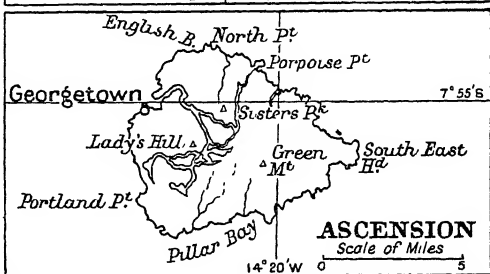
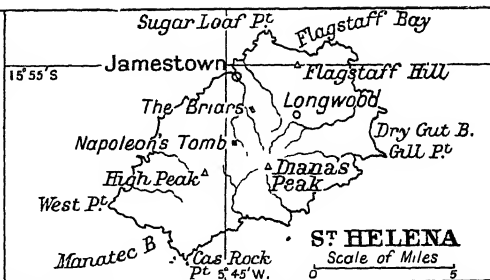
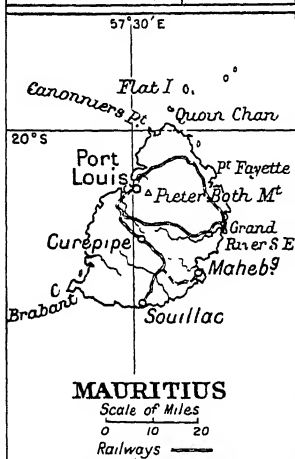
There are no streams and no trees ; indeed next to nothing grows on the lower ground at Ascension. Only on and around Green Mountain is there moisture enough to support grass, with plants and shrubs (e. g. the castor-oil plant), many of which have been introduced from Australia. On the moister upland some fruit and vegetables are grown, and some pasturage found, mainly for sheep and goats. The land fauna is very poor, and does not even include any indigenous birds other than sea-fowl, and notably the countless wideawake (*Sterna fuliginosa*) ; rats and land-crabs are numerous, but of less importance than the fish around the coast, and especially the female turtle, which are caught when they land to lay their eggs and kept in tanks until needed.

As at St. Helena, the main settlement, Georgetown, is at an anchorage on the lee side of the island, but there are no inhabitants except the people belonging to the establishment that has been maintained here by the Admiralty for nearly a century, to provide ships' stores and serve as a sanatorium. There is a pipe-line to Georgetown with gathering and storage tanks in the hills where alone Dampier was able to find fresh water, oozing from beneath a scarp, when he was wrecked here in 1701. Ascension is in telegraphic communication by submarine cable with South Africa by way of St. Helena, and with Europe by St. Vincent (Cape Verde Island), and also by Sierra Leone ; the mails are carried by certain of the South African steamers which call monthly, both here and at St. Helena.

In all the British empire the Government of Ascension is unique : the whole island is in charge of a naval officer, and is by him uniformly administered just like a ship of war.

Biblio-
graphy.

Note —The letter in brackets prefixed to each entry shows which of the islands is there treated (A) = Ascension ; (H) = St. Helena ; (T) = Tristan da Cunha Group



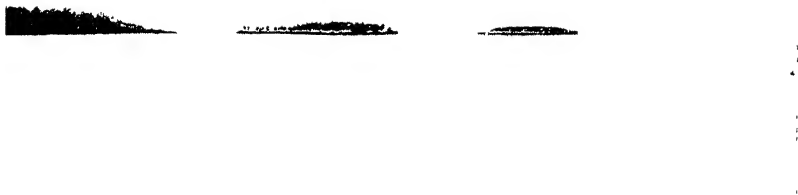


PLATE XXVII (*a*). SALOMON, CHAGOS; FROM LAGOON. WEST
END OF FOQUET, SEPULTURE, JACOBIN, AND SEL



PLATE XXVII (*b*) DIEGO, CHAGOS. LAGOON CLIFF NEAR
BARACHOIS SILVAIN

(Photo Professor J. Stanley Gardiner)

(H) [Colonial Report], *St. Helena, Annual*. (H) [Colonial Report], by D. Morris, *On Agricultural Resources of St. Helena*, 1884 (reprinted 1906). (H) [Colonial Report], by J. T. Cunningham, *On Fisheries of St. Helena*, 1910. (A H T) [Hydrographic Office, Admiralty], *Africa Pilot*, Part II, 1901 (5th ed.). (T) *Report on the Scientific Results of the Voyage of H.M.S. Challenger. Narrative*, vol. i, 1st part (pp. 240-69), 1882. (A) H. R. Brandreth, *et al.*, 'A Communication on the Island of Ascension' (in *Journal R. Geogr. Soc.*, vol. v, 1835). (A H) C. Darwin, *A Naturalist's Voyage round the World* (chap. xxi), 1845 (many reprints). (H) J. C. Melliss, *St. Helena : a Physical, Historical, and Topographical Description*, 1875. (H) A. R. Wallace, *Island Life* (chap. xiv), 1880 (3rd. ed., 1902). (T) R. N. Rudmose Brown, 'Diego Alvarez, or Gough Island' (in *Scottish Geogr. Mag.*, vol. xxi, August—see also January—1905).

Admiralty Charts—(A) no. 1691, Island of Ascension, 2 miles to an inch, Maps. with 4 insets of anchorages, 6 inches to a mile, 1910; (H) no. 1771, Island of St. Helena, 3 miles to an inch. (Revision of survey of 1879); (T) no. 2228, Tristan da Cunha group, Tristan Settlement, and Gough Island; various scales. (Revision of survey of 1853). Also (H) [War Office], I.D.W.O., no. 1853, Topographic Map of St. Helena, 2½ inches to a mile, 1904. Printed in colour, shows contours at intervals of 100 feet.

CHAPTER XXII

ISLANDS IN THE INDIAN OCEAN

MAURITIUS, SEYCHELLES, AND DEPENDENCIES

BY PROFESSOR J. STANLEY GARDINER

I. *The Smaller Islands*

IN the western half of the Southern Indian Ocean ^{Distribu-} between 2° and 22° S. lat., that is, in the tropical region, ^{tion.} there are a large number of islands. Madagascar is a continental land, and depending on it are some islets in the Mozambique Channel, as well as the Comoro Islands. All the rest are oceanic, and all, with the exception of Réunion, belong to Britain. The western half of the ocean has a uniform depth of 2,300 fathoms, with its series of banks and islands rising steeply, while the eastern half is a region of deeps, to which the names Wharton, Maclear, and Enterprise are given, with two

solitary islets, Cocos-Keeling and Christmas. The site of the western series of islands is that of the former extension of a great land-connexion between Africa, Madagascar, and Southern India, which persisted until the Tertiary period. All the greater banks were probably connected with this former land, the extent of which is indicated north of latitude 2° S. by the line of the Maldives and Laccadives, but some of the islands, particularly those lying on small banks, must be deemed to be built upon foundations laid down by more recent volcanic disturbances, and not directly part of the old continent. Our knowledge of the existence of this ancient land-connexion is based on geological evidence and on that of the distribution of existing animals and plants. The general topography unfortunately gives little indication of its existence, for depths between the banks of 2,000 fathoms have been recorded in several places, only 500 or 600 fathoms less than the depths found on either side.

All the above islands belong officially to the colonies of Mauritius and Seychelles, and will be found recorded at the end of this notice. The two colonies were separated from one another in 1903, but the division of their dependencies was made on no geographical basis, and their treatment together is therefore necessitated. Most of the islands and small banks lie in a rather closed crescent, extending from the north of Madagascar to Mauritius, in size 900 miles across by 2,200 miles round. The great banks, on which the Amirante and Seychelles Archipelagoes rise, lie to the north. The even larger Saya de Malha and Nazareth Banks, estimated to cover over 14,000 and 12,000 square miles, lie to the east; they have no surface reefs or land except to the extreme south of Nazareth, where lies the Cargados Carajos group. Mauritius, the largest island, lies to the extreme south, and is noticeable in having no broad bank around it within the 100-fathom line. Agalega and Tromelin Islands lie in the middle of the crescent, while Cosmoledo, Astove, Assumption, and Aldabra lie on a horn projecting to the west, a little north of Madagascar. Glorioso lies

further south in the Mozambique Channel. Rodriguez is quite separate, about 300 miles almost due east of Mauritius. Lastly, there is a large archipelago of banks with small islands, the Chagos group, about 1,100 miles east of Seychelles and almost in the middle of the Indian Ocean.

Mauritius, Rodriguez, and seventeen out of the nine-Physical
teen islands which constitute the Seychelles Archipelago, charac-
are relatively high islands formed of granitic, more teristics,
modern igneous, or elevated rocks. All the rest of the
islands are coral islands, that is to say, are islands built
up of the same material which forms coral reefs, and are
themselves resting on coral reefs extending out at low-
tide level from their shores as surface reefs. Such reefs,
whatever their foundation may be, are generally built up
in their uppermost 20 fathoms by the limestone skeletons
of corals and various algal plants, their interstices partially
filled in by the shells and spicules of marine animals.
When their surfaces reach the low-tide level, they can no
longer grow upwards, and they appear as flats on the
surface of the sea. They often attain great size; thus
Cargados Carajos is of crescentic shape with its convexity
to the east, 26 miles from horn to horn by about 9 miles
in depth, with over 50 square miles of surface reef;
Providence is of about the same size but almost straight.
Similar isolated banks of small size are Astove, Assump-
tion, Coetivy, Platte, S. Pierre, Agalega, and Tromelin.

Frequently the surface reef forms a ring surrounding
a lagoon of shallow water, the whole known as an atoll.
Channels for the inset and outflow of the tide commonly
exist into the lagoon, which never attains a greater depth
than 50 fathoms. Aldabra, Cosmoledo, Farquhar, Al-
phonse, and François are all atolls with passages through
their rims, mostly too shallow for ships, and lagoons of
1 to 10 fathoms in depth. In the Chagos Archipelago,
Egmont, Salomon, Diego Garcia, and Peros Banhos are
similar, but with passages into their lagoons, in the case
of the last two deep enough for the largest ships. Desroches
and Great Chagos are very imperfect atolls with parts of

their rims submerged, their banks having deeper water in their centres. The Amirante bank has surface reefs on a shallow bank, which extends through $1\frac{1}{2}^{\circ}$ of longitude. Lastly in this series Saya de Malha and some Chagos banks are areas within the 50-fathom line, with no surface reefs.

The land on these coral reefs is formed either of rock or of sand. Sand may be washed up anywhere above high-tide level by the waves to form land, and wind dunes may then be blown up as in most of our islands near the north of Madagascar, and in Coetivy. Such dunes in Assumption reach 90 feet high, and some to the south of Aldabra are little less. Rocky land may have been formed by masses of reef material rolled up by the waves, particularly in storms and hurricanes, later consolidated by sand, rain, &c. Such piled-up rocky masses in a loose condition are never found far from the seaward edge of any reef, the force of the waves gradually lessening over the reef's surface, so as soon to become incapable of transporting heavy material. Other rocky land has been formed by some change of level of reefs and sea in respect to one another; it may be formed of any admixture of coral rock and sand, but in all cases it is almost pure limestone. In Aldabra and S. Pierre it is difficult to see the composition of the rock, as most of it has been metamorphosed to a crystalline limestone which after rain erosion causes the surface of the land to be a mass of fine-pointed pinnacles. Elsewhere no such metamorphosis has occurred, and in every island some elevated rock is found. Nowhere except in Aldabra and S. Pierre is the 'elevation' more than 25 to 30 feet above the sea, and with the same exceptions in nearly every one of the larger islands are found all three classes of rock. It is needless to say that all these coral islands are necessarily oceanic, and the life upon them is of course restricted to such forms as are carried to them by ocean currents or other agencies, and of these only limestone-loving types will survive. Aldabra is the home of large herds of giant tortoises.

On the character of the surface material (soil) depends the prosperity of each island. Thus S. Pierre and Aldabra, having dense impenetrable rock, are being exploited for loose guano as well as for phosphate of lime. The islands of Cargados Carajos, Platte, and several islands of the Amirante group, are being, or have been, dug for loose guano. Piled-up coral rock is the best land for coco-nut planting, and two or three acres quite commonly yield a ton of the dried kernel, copra. Washed-up sand is not nearly as good, but is generally much better than 'elevated' land, which must be dug or blasted deeply for planting. As much land as possible is planted with coco-nut, the produce of which is exported as copra or as coco-nut oil. A common tree introduced for firewood is the Australian *Casuarina*; it forms great avenues in Desroches. In addition, most islands export a certain amount of true tortoiseshell from the hawksbill turtle, and some a little dried fish. Aldabra is peculiar in having large mangrove swamps, the tree bark from which is exported for tanning. From some reefs a little pearl shell comes, but not enough to be important. In accordance with the development of each island there exist gardens, which are manured with floating pumice, collected from the shore; in these are grown bananas, gourds, papaya, yams, and various vegetables, while the bread-fruit is planted near the settlements. In some islands maize is planted, and in all pigs and fowls are kept. Most of the islands belong to residents or companies established in Seychelles or Mauritius, and are worked by white or half-caste managers with negro labour, descendants of liberated slaves, paid partially in rice and partially in money. Women are scarce. The plantations and works are visited by their owners' sailing vessels two or three times a year, and generally once a year by a magistrate, who is also a doctor. All are thoroughly healthy, except Aldabra, having no swamps to breed the malarial mosquito, and no endemic diseases. None has indigenous inhabitants, and many have been worked only in the last quarter of a century.

Product
popula-
tion, &c.

Most of the islands of the two colonies are subject to the southern equatorial winds of the Indian Ocean, which blow from south-east to east, or even to north-east. They are most regular during the south-west monsoon of the northern hemisphere from April to October, but the north-east monsoon may affect them even down to 10° S. June to September is the season of strong winds, absence of hurricanes, and clear weather, and November to March of light winds, rains, and hurricanes. The latter generally rise between 8° and 16° S., and hence only the Seychelles, Amirante, and Chagos islands are immune from their destruction; they seldom, however, pass west of Madagascar. Such currents as there are are wind currents; the surface of the sea has a temperature from south to north of 72° to 82° F. The average rainfall on the islands is probably about 40 inches; much of this is collected in tanks, for otherwise the inhabitants are dependent on brackish wells.

The Chagos Archipelago is of importance as lying almost in the centre of the Indian Ocean and in possessing excellent harbours of large size in Diego Garcia and Peros Banhos. They were discovered about the same time as Rodriguez and settled in the end of the eighteenth century. They are entirely coco-nut islands belonging to Mauritian companies. For labour they are dependent on creoles and negroes. Their sole communication, too, is with Mauritius, through which their food is imported. Diego Garcia was made a coaling port by the Orient Line to Australia in 1881, but coaling was given up in 1883.

II. *Mauritius*

The island of Mauritius is 35 miles long by 24 miles broad, with an area of 720 square miles and a maximum elevation of 2,710 feet. It is a volcanic island with mountains rising rather precipitously, but it has been so weathered that little indication remains of the original scheme of the eruptions to which it owes its formation. There are three ranges of mountains, each with peaks over 2,000 feet, viz. Pouce behind Port Louis, Tamarin-Rempart



PLATE XXVIII (a). LAGOON OF ALDABRA, SHOWING EROSION
OF ELEVATED CORAL ROCK

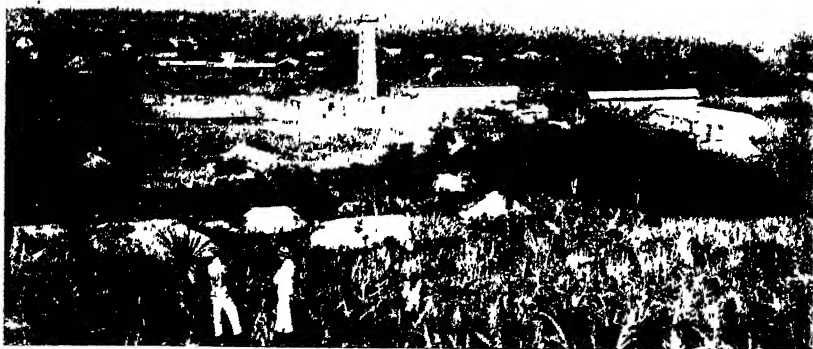


PLATE XXVIII (b). MAURITIUS. SUGAR FACTORY, VACOA,
AND EASTERN MOUNTAINS

(Photos. Professor J. Stanley Gardiner)



PLATE XXIX (a). CANYON AND FALLS NEAR VACOA, MAURITIUS



PLATE XXIX (b). ILE D'AMBRE, MAURITIUS. GROWTH OF
MANGROVE SWAMP

(Photos. Professor J Stanley Gardiner)

to the south-west, and Bamboo to the south-east. Between them they give to three-quarters of the island an elevation of over 1,000 feet, and form a plateau in the centre of the island of over 1,500 feet. The remaining land to the north-east slopes into a flat with isolated peaks, such as the Butte aux Papayers, on which the semaphore station is situated. While the 100-fathom line elsewhere closely follows the shore, it runs out for 15 miles in the same direction to include a shallow bank of 20 to 30 fathoms, on which are Serpent, Round, Flat, Gabriel, and Gunner's Quoin islands, of which Round is 1,055 feet high.

Of the mountains, Pouce, Bamboo, and Rempart ^{Physical features.} probably belong to the same period, but the Tamarin range, with its Savane and Rivière Noire sections, would seem to have been of more recent formation; in any case, this range confuses the otherwise fairly regular contour of the central mass of the island. The line of mountains is not clearly visible to the north-east, but there is a series of lower hills with steep slopes between Grand River South-East and Nouvelle Découvert. The Pouce and Bamboo mountains are both remarkable for the steep buttresses of their seaward sides, between two of which Port Louis is situated. The central plateau between the mountains is much broken up by supplementary cones and craters, masking its structure. The rainfall is heavy, so that the plateau is channelled by streams, of which Grand River (opening near Port Louis) and Grand River South-East are the most important, flowing through deep gorges and cañons, with many waterfalls. The hills of the plateau are generally weathered smooth by the rains, but Pouce and Bamboo present a series of jagged peaks of fantastic shapes. Pieter Both mountain (2,676 feet), behind Port Louis, has a head joined by a narrow neck to its body, and many others have columns and overhanging cliffs which could scarcely have continued to exist in a land much affected by seismic disturbances. The Tamarin mountains form a crowded series of peaks and valleys, while

the area between their eastern limit and the Bamboo range is a fertile plain about 400 feet above the sea, known as Grande Savane. The high land, where it meets the sea, ends in cliffs, but there is generally a low flat between ; this in places is masked by cliff débris. It is formed partly by an upwashing from the fringing reefs, which surround most of the island, and partly by some recent change of level of sea and land. This change is most clearly visible at Grand Port, where there is a considerable lagoon between the reef and the land ; it was an elevation probably of about 80 feet, and it is shown by the elevated coral limestones at Treize Cantons and those forming most of the islets of the vicinity, some of which lie on the barrier reef.

Settle-
ment.

Mauritius was first discovered by the Portuguese sailor, Pedro Mascarenhas, in 1505, and named Cerné, from a notion that the island was so called by Pliny ; it was uninhabited. It remained in the nominal possession of the Portuguese until 1595 as a port of call, but there was no settlement, though deer, goats, monkeys, and pigs were introduced. The Dutch rediscovered the island in 1598, and re-named it Mauritius after Count Maurice of Nassau. Their squadron refitted at Grand Port, where a garden of over 150 acres was enclosed and planted with vegetables. A settlement was established in 1638 at Grand Port, and some of the coastal lands were cleared, much ebony being exported. Plantations of cane, tobacco, vegetables, &c., were established by the help of convicts from Batavia and slaves from Madagascar. Many of the latter escaped to the mountains, where they formed a large body, the Marons, the depredations of whom caused the abandonment of the island in 1712. The French East Indian Company took possession in 1715, and a settlement was founded from Réunion in 1721. The Company's rule was not established over the Marons until the time of Mahé de la Bourdonnais, 1735-46, who armed blacks from Madagascar for their subjugation. Under this governor the seat of government was transferred to Port Louis on the leeward side ; large workshops

and shipbuilding yards were established, the town was fortified, roads built between all the chief points, the island divided up for administration, the forests cleared, and their sites planted with cotton, indigo, and especially sugar.

On the decay of the French East Indian Company the island fell into disorder, and was ceded to France in 1767, after which it made such further progress that at the end of the century it had a population of 65,000. It further advanced under Napoleon, and became a favourite station for privateers preying on English commerce, as well as a dockyard for the repair of French ships. The Indian Government consequently determined on its reduction, and in 1809 Rodriguez was annexed. Bourbon surrendered in July 1810, and Mauritius, then known as L'Isle de France, capitulated a few months later after a series of frigate actions highly creditable to the French. In 1813 the slave-trade was abolished, and in 1814 our possession was finally confirmed by the Treaty of Paris, Réunion reverting to the French crown. Relations were entered into with Radama, then monarch of most of Madagascar, but they were not followed up or that island would probably now be a Protectorate of Britain. In 1825 the colony made a great step in advance, when its products were allowed into Britain on the same terms as those of the West Indies. It suffices, further, to mention that on the emancipation of the slaves in 1835 Indian labour was introduced for the estates, and that the present population of the island is upwards of 360,000.

When first discovered the greater part of Mauritius was Fauna. covered by dense forests, but there are no parts which have not been destroyed by axe or fire. In addition, introduced animals and plants aided largely in the destruction of its indigenous life. It was the home of a large flightless pigeon, the dodo, which was probably finally killed out by the pigs about 1683. Rodriguez also had a large flightless bird, the solitaire, which became extinct about 1731, and Réunion a third bird even larger. Giant land tortoises would also seem to have existed at the same time, as one is represented in an early

woodcut. Most of the plants and animals found on the coral islands of the vicinity occur on the coast-lands of Mauritius, but in addition there is a relatively immense fauna and flora nearly all of peculiar species and many of peculiar genera and even families. The number of species is considerably larger than would be expected on a purely oceanic island, situated at so great a distance from continental land, and they are mainly related to Madagascar forms. This relationship is the more remarkable because the currents set west or north-west, so that only exceptionally could seeds, or animals, arrive from Madagascar. A land-connexion between is demanded by geographical distributionists up to the middle Secondary period ; it is not required to explain the existence of the flightless birds, which are known to have had ancestors of powerful flight, but for the land mollusca and plants. This hypothesis is discounted by the fact that Mauritius is purely volcanic, but it is possible that the immense Nazareth and Saya de Malha banks were land areas once. Wild boars, deers, partridges, guinea-fowl, and a few water-birds afford sport.

Climate,
agricul-
ture, com-
munica-
tions,
trade, &c.

The mean temperature on the coast is only about 75° F., and the rainfall about 45 inches, more in the hills. There is much standing water, and malaria is rife and peculiarly deadly. At times there have been epidemics of cholera, small-pox, and bubonic plague. The forests that exist now are low and scrubby, and found principally in the region of the Tamarin mountains. Many of the mountain slopes are almost bare. All possible land for sugar planting has at some time or other been cleared, and the best land is still laid down in the same crop, the biggest estates lying to the north-east of the island. Much of the land, not now sufficiently good for sugar estates, is farmed by Indians in small plots, the cane being carried to the nearest mill ; they also raise a little vanilla, coffee, potatoes, tobacco, vegetables, and fruits for sale, manioc (a material like arrowroot) and bananas for food, a cow or goats, some pigs, &c. The people, however, are largely dependent on India and

Australia for rice and corn, on Madagascar for cattle, and on Britain and France for manufactured goods. If the sugar crop fails, or the price falls, the people starve. There are 131 miles of railways from Port Louis, through which all the trade passes. Regular communication is maintained with Marseilles by Messageries Maritimes steamers, with South Africa by the Union Castle Line, and with Ceylon and India by the British India Line. The Eastern Telegraph Company gives communication with the world. The currency is the rupee, which is divided into cents.

The population of Mauritius consists of the descendants of French and English, and of their slaves, there being every degree of blood admixture ; they are mostly Roman Catholics. The Indians number about 250,000, and of these four-fifths were born on the island. The island is divided into nine districts, which have representation on the Government Council. The language is a French patois, Creole, and the laws are based on the Code Napoleon. The revenue is mainly derived from a customs duty of 12 per cent. Port Louis has a population of over 60,000, but people live when possible in the more healthy hills of the province of Plaines Wilhelms, where the British troops are also garrisoned. Pamplemousses to the north has a noted meteorological station, but its famed botanical gardens are now of no account.

Mauritius grew into importance on its transit trade, which was entirely killed by the opening of the Suez Canal. It is now dependent on its sugar crop, the profits from which may be destroyed by hurricanes, bounties, or tariffs. Of these the first most seriously affect the crops, the colony lying in one of the worst regions in the world. It is also one of the most densely inhabited countries, a noteworthy fact, as it has no manufactures. The dangers of this condition of affairs cannot be over-estimated. If the Indian population further increases, an outlet for the surplus population must be found, and the natural geographical connexion of the island and also of Seychelles and their dependencies is with East Africa.

III. *Rodriguez*

The island of Rodriguez, 300 miles east of Mauritius, is 11 miles long by 5 miles broad, lying east and west ; it resembles its sister island in being a rugged, much-weathered mass of volcanic rock. The coral reef fringes it on all sides, in parts to the east 100 to 200 yards broad, but extending to 3 to 4 miles north and south, and west about 2 miles. An irregular passage within the reef, having sufficient depth for boats at any state of the tide, extends round most of the island close to the shore, and there is a narrow channel through the reef leading to a small lagoon of 3 to 10 fathoms, named from its position Port South-East. Mathurin Bay, in the reef to the north, is the usual anchorage, the prevailing winds being from east to south-east. The 100 fathom line forms round the whole a bank 32 miles long by 16 miles broad, with so steep a slope between 50 and 100 fathoms that the lines of the two depths almost coincide. Scattered over the reef are a number of islets, of which most of those near the shore are volcanic ; the rest are of limestone, some being elevations, other accumulations of débris.

The island is exceedingly hilly. A broad ridge with several peaks runs down the centre with its highest point in Mount Limon, 1,300 feet. Its sides are cut into deep ravines, often with inaccessible cliffs around their terminal ends but opening out near the sea into wide valleys between terraced ridges. These ridges are in some places marked by columnar basaltic cliffs, the most remarkable being Tonnerre cliff (200 feet) behind Mathurin Bay. The streams are mostly seasonal torrents, forming series of cascades and falls descending to the sea. To the east the volcanic mountain chain slopes steeply to the sea, but to the west it passes into a broad limestone plain, studded with elevations up to 530 feet high. Patches of limestone are also found in the volcanic region, particularly to the east, clearly indicating an upheaval of several hundred feet since the island was first formed. Raised beaches on the south shore, 20 feet in height, and

certain of the coral islets indicate a further subsequent change of level.

A Portuguese commander, Rodriguez, discovered the island about 1510, and in 1691 the Dutch unsuccessfully attempted to colonize it with fugitive French Huguenots, among whom was Leguat (see Bibliography). The French East Indian Company used it as a garden for Mauritius, growing maize and corn and exporting dried fish, turtles, and land tortoises. It was occupied by Britain in 1809.

Rodriguez, when first discovered, was a land adorned with great and lofty forests, through which wandered vast numbers of flightless birds, the solitaires, and giant land tortoises. Now it is a bare, parched pile, completely destroyed by the ignorance of man, almost half of it being naked rock denuded of soil by the rains. Frequent fires have swept it. In such forests as remained the larger trees were cut, causing indirectly the destruction of all around them. Goats and pigs prevented any natural re-afforestation. The spongy soil beneath the forests of the hills supplied perpetual waters to the fertile valleys, while now drought is a danger for half the year. Lastly, the weeds and grasses of civilization destroyed most of the still-surviving native plants. The destruction was particularly bad on the western limestone plain, but it has exposed many great caverns full of beautiful stalactites and stalagmites. Probably half the plants were destroyed, but from what is left (175 Phanerogams) it is clear that the endemic flora was large and of Mascarene affinities, a conclusion supported by the fauna, which at the present day is of little interest. The solitaire, probably a flightless pigeon like the dodo but remarkably distinct, died out early in the eighteenth century, and the land tortoises subsequently, 30,000 being exported in 1760-1 in the course of eighteen months.

Rodriguez is still a garden for Mauritius, though but a barren one ; its pasturage is now used for cattle. Beans, maize, salt fish, cattle, goats, and pigs are its main exports. The population numbers about 3,000, mostly settled near Port Mathurin. They are French creoles of

negro or mixed descent, Indians being few. The government is in the hands of a resident Mauritian magistrate. The physical conditions are similar to Mauritius, but the island is healthy. There is frequent communication with Mauritius, and an important transmitting station of the Eastern Telegraph Company has been erected at Port Mathurin.

IV. *Seychelles*

The Seychelles Archipelago consists of two coral islands and seventeen granite islands, of more than 110 square miles in size, situated on a bank about 300 miles long by 100 miles broad within the 50 fathom line, perhaps 12,000 square miles in area. Bird and Dennis lie towards the northern edge, where there is some trace of a shallower rim, and are of coral formation. The rest lie towards the centre, almost within sight of one another, and rise into elevations, which vary in height with the size of the islands. Mahé is the largest, covering an area of about 53 square miles and rising to 2,993 feet. Praslin is 27 square miles in area and 1,260 feet high, Silhouette 8 square miles and 2,473 feet, and La Digue 4 square miles and 1,175 feet. The other more important islands are Frigate, Curieuse, Félicité, East Sister, and North.

Physical
features.

Mahé and Praslin have a series of grey granite peaks down their centres with buttresses extending out on either side, between which the streams have cut their courses, falling in cascades and waterfalls of great beauty. In Silhouette the highest hills are arranged like the letter Z, and most of the smaller islands have simply one or two peaks. The granite is generally uniform in composition, but exhibits dykes of finer grain down which the water-courses have been cut ; it is a rock with affinities particularly to the granites of Africa and Southern India. Its natural tendency is to split up by vertical and horizontal fractures, and this character is carried so far as to form great precipices, at the foot of which accumulate rectangular blocks of the rock. Exposed mountain faces, and even quite isolated rocks, are deeply scored by the rain,

which averages in the hills over 120 inches annually. The hills are deeply furrowed and the ridges are sharp. This tremendous weathering bears striking testimony to the antiquity of the existing land. Mahé slopes up along its eastern (windward) face from the beach to a line of precipices, situated 150 to 250 feet above the sea, at a quarter to half a mile behind the shore, and cut only where mountain streams descend. Behind are two or even three similar slopes with precipices in places behind, culminating in a peaked ridge of 2,000 to 3,000 feet high extending along half the island. The western side is similar, but the exposed rock is less noticeable. Coral rock is found up to 30 feet above the sea, showing the recent change of level characteristic of the western Indian Ocean.

The Portuguese discovered the Seychelles, which appear on a chart of 1502, and more clearly on one of 1520, with most of the other islands north of Madagascar. Jourdain visited them in 1609, and writes of their giant land tortoises and crocodiles, both now extinct. Mahé de la Bourdonnais sent expeditions to explore them in 1742 and 1744, and they were formally annexed to Mauritius, being called 'Les Îles de la Bourdonnais' with chief island 'Mahé'. The reports received were unfavourable, principally because the navigation was naturally difficult to sailing ships, and because the vegetation was all of new type and therefore worthless. In 1756 the name was changed to Séchelles after the then French Contrôleur des Finances. In 1769 the Abbé Rochon discovered the immense double coco-nut or 'coco-de-mer', a well-known Indian curiosity, much used by Indian medicine men. Shortly afterwards a small establishment was formed for the cultivation of nutmegs, cloves, and other spices. Captain Newcombe, H.M.S. *Orpheus*, captured the islands in 1794, and their possession was confirmed to Britain by the Treaty of Paris, 1814. Subsequently captured slaves from dhows were for some years brought to the islands, which in 1903 were separated from Mauritius and made a distinct Crown colony, the lesser dependencies being

divided up in accordance with the residence of their owners, Mauritius [or Seychelles.

Vegeta-
tion.

The granite has over much of its surface deep soil, which supports a luxuriant vegetation. In the highest lands of Mahé and Silhouette the ancient jungle persists, though the larger trees have been cut. It is a regular tropical rain forest, formed of great trees often hung with moss, ferns, orchids, and lianes. Tree-ferns, peculiar palms, and great patches of screw pines occur, the ground being dank and dark beneath or having an undergrowth made brilliant in places by begonias and groundsels. Many of the trees have buttresses for their support, and some a mass of great aerial roots, hanging down over the precipices in search of crannies. Below are coco-nut-covered slopes or estates planted with patches of vanilla, a climbing orchid supported on stakes, or rows of the less profitable coffee, cloves, pepper, and cardamoms broken by masses and precipices of bare rain-scored rock. Still lower is the coco-nut-covered shore with swamps of mangroves near the mouths of streams, and outside all rests the reef of purest green with its white edge of surf, broken by channels here and there. It is a scene of marvellous beauty, and the archipelago well merits the name 'Garden of Eden' applied to it by its former governor, Gordon, who was to lose his life in a desert town of Sudan.

All or nearly all the endemic plants of the granite lands are peculiar species, and many belong to peculiar genera. The ancient hill jungle forms a sponge, which swells and shrinks with the humidity, feeding streams in the valleys. Praslin and many of the smaller islands as well as the south of Mahé have little of it left, but the Government in 1907-10 wisely bought the high lands behind Victoria, and the proprietor of Silhouette is fully aware of their importance, so that some parts of these islands should remain a perpetual garden. The Government also reserves a valley in Praslin densely planted with 'coco-de-mer', a tall palm each nut of which weighs over 40 lb. and which requires seventy-two years for a generation ;¹

¹ The nuts are like an enormous double coco-nut, partly split in the



PLATE XXX (a). SUMMIT OF MOUNT SEBERT (1,600 feet), MAHÉ, SEYCHELLES. (*Pandanus multispicatus*)



PLATE XXX (b). MOUNT SEBERT, MAHÉ, SEYCHELLES. (GLACIS)
(Phots Professor J. Stanley Gardiner)

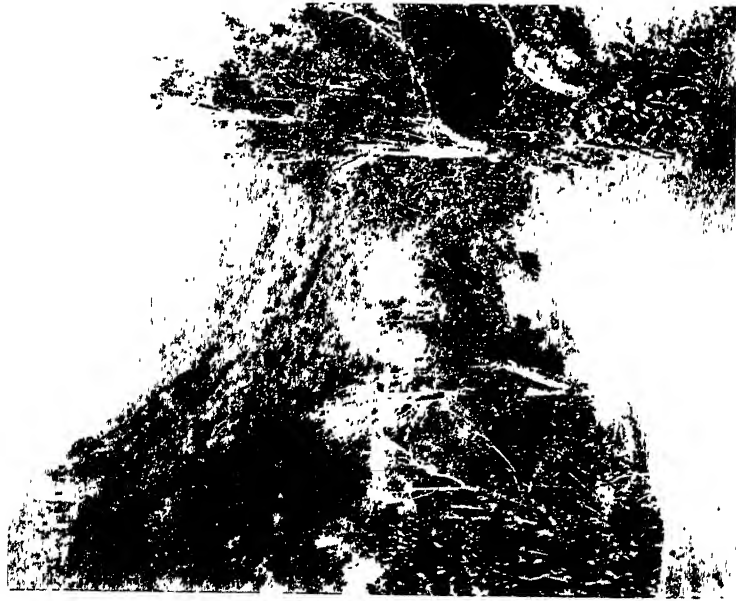


PLATE XXXI (a) TROIS FRÈRES MOUNTAINS,
MAHÉ, SEYCHELLES

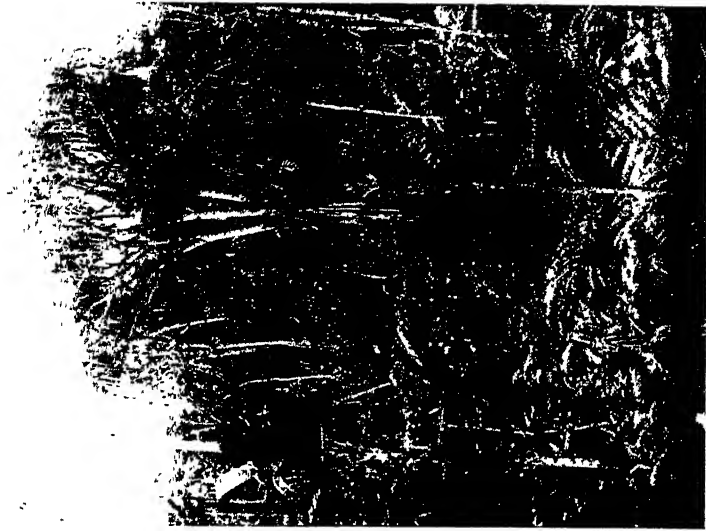


PLATE XXXI (b). HIGH FOREST, SEYCHELLES
(SCREW-PINES, PALMS, AND FERNS)

(Photos, Professor J. Stanley Gardner)

its distribution is confined to Praslin and the neighbouring island of Curieuse ; perhaps its existence more than any other fact has brought fame to Seychelles. In cultivated lands as well as in some hill-tops the cinnamon tree is found, a wanderer from the French gardens of the eighteenth century.

Of animals there is only the flying fox and another bat, *Fauna*. but herds of dugong once gave an alternative name, 'Vaches Marines', to Dennis Island; the Malagasy tenrec has gone wild. The peculiar land birds are nearly extinct, but others have been introduced, of which the beautiful cardinal and other finches make the cultivation of rice impossible. Giant land tortoises and crocodiles have been killed out, but a few herds of the Aldabra tortoises are kept. Other reptiles and amphibians are relatively abundant and peculiar, especially the worm-like coecilians. Of insects there is an immense variety, and there are many other forms of lowly life.

Collectively both animals and plants are remarkably varied for so small an area of land. They have their main affinities with Madagascar and South Africa, but there is some relationship with India too. Their distribution can only be explained on the view that the Seychelles were once connected with both these continents, a view supported by its formation of granite, a regular continental rock. In any case the much-dissected land-masses, as well as the broad bank around the group, probably cut by the sea from land, point to great antiquity.

Victoria, north-east of Mahé, is the capital of the group. It has an excellent harbour, formed partially by a break in the reef and partially by the protection afforded by outlying islets. It is the sole port in the group, since a reef fringes the coast nearly everywhere with only boat-passages through its seaward rim, though plenty of protected anchorages may be found. Small ship repairs and coaling are possible at Victoria. The population of the group numbers about 23,000, and in Mahé,

*Population ;
economic
conditions, &c.*

centre. They are of two forms, called male and female, though either can produce the male or the female tree.

Praslin, and La Digue much of the land is divided into small holdings, other islands mostly belonging each to a single proprietor. The language and customs are French, the aristocracy being creoles from Mauritius. The labour is negro, liberated slaves, or descendants of negroes with some admixture of Indian blood. Some of the store-keepers are Indian, but most are Chinese, a race highly reputed in the group for its honesty. The large majority of the people are Roman Catholics. The Governor is assisted by nominated members on his council, and there is a separate resident, who is also doctor, in Praslin. Mahé has good riding tracks over the hills, and Victoria an excellent water system. The islands have neither fever nor other contagious diseases, and, having an equable climate tempered by sea-breezes, are very healthy. Victoria has a small botanical station, and experiments in agriculture are carefully fostered. There is a transit station of the Eastern Telegraph Company. Mail communication is with Marseilles by Messageries Maritimes, and there are occasional ships of the British India line to Zanzibar.

All tropical vegetables and fruits grow with luxuriance in Seychelles, and most of such suitable produce has been tried at some time or other for export. The French grew spices, and later trade commenced in cotton, rice, dried fish, and timber. Vanilla succeeded, and in 1899 formed five-sevenths of the exports of the colony. Land was cropped with vanilla for ten to twenty years. It was then planted with coco-nuts, which had always been cultivated on the coastal plain; these yield the most stable and dependable crop in the tropics, and their oil has usually been the most valuable product of this colony. Rubber was introduced in 1904, and in 1910 a large English company was formed to exploit various estates in Mahé. In 1906 a small distilling industry for cinnamon, cloves, and other oils was started. Scale insects, followed by fungoid pests, as well as boring beetles, cause much destruction. There has always been some loose guano taken from the islands, but in 1907 an English company

started to export it systematically, paying a royalty of £ 3 per ton. An establishment was founded on the then uninhabited dependency of St. Pierre, which produces over 20,000 tons per annum ; the dependency of Aldabra has since been developed for the same purpose. Turtles come from the dependencies as well as dried turtle and tortoise-shell for export. Turtle flesh is eaten, but there are plenty of cattle, goats, and fowls. Fish is abundant, but it is not as yet systematically caught and cured for export. Many of the banks and reefs are suitable for pearl shell and sponge cultivation. The imports are the same as for Mauritius.

Year by year distance becomes less important, and the Seychelles Islands can no longer be regarded as isolated. Indeed, the colony must now be deemed as of more importance to Britain even than Mauritius. It stands between British possessions in India and those of other powers in Africa and Madagascar. It has also in Victoria a port capable of fortification and development, and in the mixed negro population a hardy people, accustomed to the sea. On the other hand the colony can never be of much economic value, while such small colonies are expensive to govern well and have obvious drawbacks. Seychelles might produce much which East Africa requires, and East Africa could send it the food-stuffs it wants. East Africa will require, when it develops, a healthy island sanatorium. Geographically, the affinity of Seychelles is with that colony.

Dependencies of Mauritius.

Rodriguez. (See separate account.)

Chagos Archipelago. Salomon, Peros Banhos, Great Chagos, Egmont, Diego Garcia. All coco-nut islands, exporting oil ; close cultivated.

Cargados Carajos. Guano, some dried fish, and the eggs of sea-birds.

Coetivy. Coco-nut island, exporting oil and some tortoise-shell.

Farquhar. At present little cultivated ; some coco-nut oil ; formerly some maize, a little pearl-shell, some turtles, and tortoise-shell.

Agalega. One of the richest coco-nut islands in the Indian Ocean, but has no safe anchorage.

Tromelin. Not inhabited ; no anchorage and seldom visited.

Glorioso. Not yet developed, but said to have some guano.

Dependencies of Seychelles.

Aldabra. About sixty square miles of land, much of it covered with mangrove swamp and thorny woods; development as yet small; cargoes of guano and mangrove bark for tanning to Europe, turtles and tortoise-shell to Seychelles.

Assumption, Astore, Cosmoledo. Tortoise-shell, turtles, dried turtle, and dried fish; guano not yet developed in Astore, being worked in Assumption, worked out in Cosmoledo.

Providance. North island densely planted with coco-nuts; south island, some dried fish and turtle.

Saint Pierre. Guano and phosphate rock.

Platte. Guano nearly worked out.

Desroches. Coco-nut island; Casuarina-wood for firing.

Alphonse-François. Coco-nut, densely planted.

Amirante Group. Marie-Louise, Poivre, Darros, St. Joseph, Eagle, African. Some guano, but most islands now planted with coco-nuts; a few pearl-shells and a little dried fish. St. Joseph is the breeding-place of a large number of pelicans.

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CHAPTER XXIII

THE DEFENCE OF BRITISH AFRICAN TERRITORIES

South Africa

THE position of the Union of South Africa differs from that of the other Dominions, in that not only is it liable to external attack from oversea and overland, but, owing to the presence of a native coloured population, outnumbering the population of European descent by four to one, there is danger of internal disturbances. It will be convenient to discuss these possible forms of attack separately.

An oversea attack must necessarily be carried out by a maritime Power, and will probably have as its object the weakening of our sea power or the destruction of our commerce. The only ports in South Africa which, by reason of their shipping and resources, are likely to invite a naval attack for such objects, are Simon's Bay, Table Bay, and Durban. Simon's Bay is the naval base of our warships in South African waters. Table Bay is a commercial port of the first importance, and being situated on the trade route to the East, would probably serve as a harbour of refuge in case of need. Durban is near the great trade routes to the East, and has a good local supply of steam coal. It may, therefore, become in time of war an important harbour of refuge for ships engaged in the Indian and China trade. The principal factor to be considered in estimating the liability of these ports to oversea attack is their great distance from the naval bases of foreign powers and from the main theatre of operations of probable naval wars.

The distances from Cape Town to the following ports and naval bases are :

		<i>Miles.</i>
France . . .	{ Dakar . . .	3,500
	{ Brest . . .	5,700
Germany . . .	Wilhelmshaven . . .	6,335
Russia . . .	Vladivostok . . .	8,640
United States . . .	{ New York . . .	6,800
	{ Manila . . .	6,800
Japan . . .	Nagasaki . . .	7,900

In view of these distances coast attacks involving the risk of damage to the ships undertaking them and the expenditure of ammunition would obviously be very hazardous operations. But these are not the only risks to be encountered. Any vessels undertaking such attacks would be obliged in the first instance to evade our fleet, and would be liable to pursuit by a superior naval force, intent on bringing them to action at the first opportunity.

A circumstance in connexion with the South African ports which emphasizes their importance in time of war is the possibility that the Suez Canal route may be closed to our shipping. If this were to occur the whole of our Eastern trade and all military reinforcements, stores, and supplies for our Eastern possessions would necessarily proceed by the Cape route. These ports would therefore become, perhaps, the most important coaling stations in the Empire outside the British Isles.

The above considerations point to the desirability of Table Bay and Durban being adequately defended to afford protection to such shipping as may require to take refuge in these ports, and to Simon's Bay being adequately equipped and defended to form a naval base for such warships as it may be necessary to send to the Cape of Good Hope station in time of war.

Such objects are Imperial rather than local in their character, and it therefore behoves the Imperial Government to see that they are properly carried out.

Overland
attack.

The only territories from which serious attacks by land could be directed against the Union of South Africa are

German East and South-West Africa. During the native wars in German South-West Africa, which lasted from 1903 to 1907, Germany was obliged to maintain considerable forces in that country, amounting at one time to nearly 15,000 men. Since the country has become more settled these numbers have been very much reduced, and the present garrisons of South-West and East Africa are not of sufficient strength to be in any way a menace to the Union. To reinforce them in time of war in the face of our superiority at sea would be a practical impossibility. The prospect of these territories supporting a sufficiently numerous white population in the future to change materially the present position is so remote as not to call for serious consideration.

The Union Government passed a Defence Bill in 1912 for the organization of the military forces of the country. The provisions of this bill and the nature of the forces that it called into being will be discussed later, and it suffices here to state the opinion that, having regard to the experiences of the South African war, the military forces of the Union, when organized in accordance with the provisions of the Defence Bill, will be fully capable of dealing with any military force that could conceivably attack South Africa.

Past experience tends to show that the contingency of a concerted general rising of the native population is extremely remote. The danger of local risings, however, cannot be disregarded, and some of the native communities, notably the Basutos, are sufficiently formidable.

Since the South African war the policy has been to leave the local governments to deal with native risings, and the Natal Government dealt with risings of the Zulus in 1903 and 1904, unaided by Imperial troops. This policy is likely to be continued, and the citizen forces now being organized, combined with permanent local forces organized on the lines of the Cape Mounted Rifles, should suffice to afford security against internal disturbances.

Till the formation of the Union of South Africa the Governments of Cape Colony and Natal made contribu-

Internal
disturb-
ances.

Naval
policy of
the Union
Govern-
ment.

tions to the Navy of £50,000 and £35,000 respectively, and all consideration of naval policy was for some years postponed till the Union Parliament came into existence. Since the formation of the Union Government the contributions of Cape Colony and Natal have been clubbed together, and a single contribution of £85,000 annually has been made towards the maintenance of the Imperial Navy.

In February, 1913, General Botha stated in the Union Parliament that his Government was considering its naval policy, and he admitted the responsibility of the Union for taking its fair share in the naval defence of the Empire. There seemed, however, to be a general feeling that while something no doubt should be done, yet it would not be fair to saddle South Africa with the task of protecting the trade routes round the Cape, the interests to be protected being to a very large extent Imperial rather than local.

The South
African
garrison.

At the conclusion of the South African war in 1902 a large garrison of British troops, amounting to 32,000 men, was left in the country. The political conditions were unsettled, and the maintenance of a considerable armed force in the country was no doubt a necessary precaution. This garrison was gradually reduced, and with the advent of representative government in December, 1906, the reasons for maintaining such a garrison were considerably modified. A large reduction was made, and in 1909 the strength of the garrison did not exceed 11,000 men. Not long after the Union Government was established in 1911 it was decided to make a still further reduction, and the garrison in June, 1913, consisted, according to the Army List, of

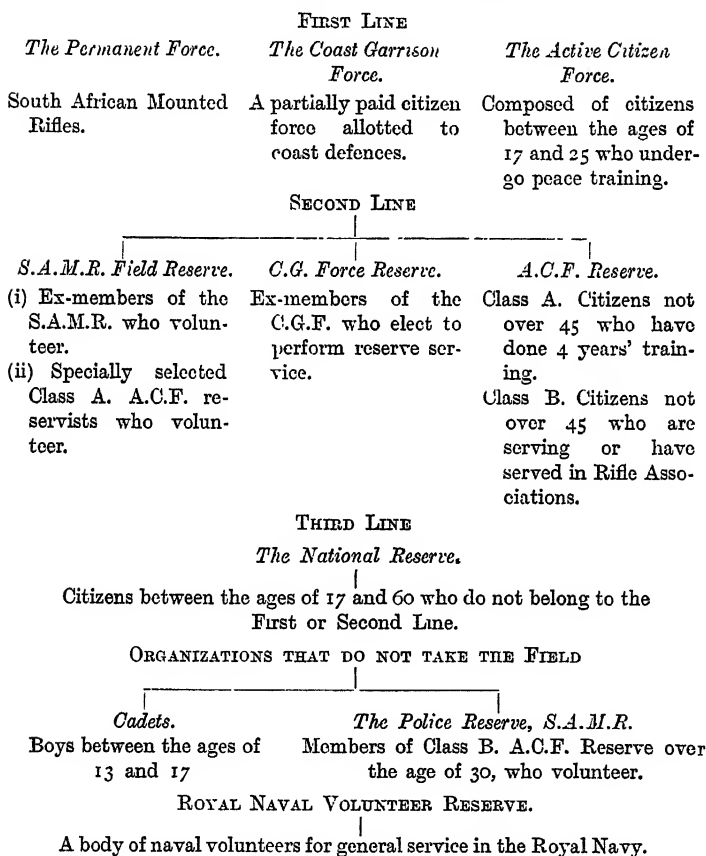
- 2 Cavalry Regiments,
- 1 Field Artillery Brigade,
- 2 Companies, R.G.A.;
- 1 Fortress Company, R.E.;
- 2 Field Companies, R.E.;
- 4 Infantry Battalions,

with a suitable proportion of departmental troops; in all

about 7,000 men. The retention of these troops in South Africa is difficult to justify on strategical grounds, and, though no doubt the Union Government would be sorry to lose them, they will probably not remain in the country indefinitely.

The organization of the forces which the South African Defence Act¹ of 1912 was designed to bring into existence is best understood from the following diagram :

The South
African
Defence
Bill.



The underlying principle of the Bill is that every citizen is liable to assist in the defence of his country. This principle has been recognized and accepted by the

¹ The legal obligations connected with military service are considered in detail in chapter viii, pp. 187 *seqq.*

people of South Africa from the earliest times, but while the principle is recognized it has been found that to train the whole population for military purposes would create a greater force than the country could reasonably require for defence, and would impose on the people too heavy a financial burden. It is intended, therefore, to train annually only such a number of citizens as are required for defence purposes, the Government fixing this number from time to time according to the requirements and financial resources of the Union.

The Per-
manent
Force.

A permanent force is required for these purposes :

(i) To provide a small but highly efficient and easily mobilized body of troops, which, without dislocating public or private business, can be moved rapidly to any spot where violence or disorder is threatened.

(ii) To furnish a highly efficient professional body of South Africans who will form the permanent administrative and instructional staffs of the Citizen Forces.

(iii) To provide a small number of complete units of artillery.

To fulfil these purposes five regiments of South African Mounted Rifles, of a total strength of 2,500, are being formed out of the old Mounted Police forces, and, in addition, a corps of officers and non-commissioned officers to act as the administrative and instructional staffs.

The Reserves for the Permanent Force are divided into two categories : The Field Reserve to expand the units of the South African Mounted Rifles, and the Police Reserve to perform police duties when the units are mobilized for service. The Field Reserve consists of ex-members of the South African Mounted Rifles and specially selected citizens of the Active Citizen Force, who have received military training. The Police Reserve consists of specially selected citizens of Class B of the Citizen Force Reserve living in the districts in which the units of the South African Mounted Rifles are stationed.

The Coast
Garrison
Force.

South Africa is the only self-governing Dominion which does not make full provision for the defence of her own harbours. The reasons are two-fold. As already explained

the interests which the harbours are designed to protect are to a great extent Imperial, rather than local, and South Africa does not at present possess any troops sufficiently versed in the highly technical duties of coast defence to undertake these duties efficiently. The home Government, therefore, maintains the nucleus of the garrisons of the defended ports, and it is proposed to expand this nucleus by raising a corps of South African Garrison Artillery from the existing Cape Garrison Artillery, and establishing a South African Coast Defence Corps for the work of engineers, electric light, signalling, telegraphy, harbour control, &c. Provision is made in the Defence Bill for the members of these Corps to receive pay for such periods as may be prescribed.

This force, on which the Union must mainly rely for its defence, is to be organized in three categories :

The
Citizen
Force.

The Active Citizen Force.

The Citizen Force Reserve.

The National Reserve.

The Active Citizen Force will have a territorial organization, and each district will be called upon to provide its quota of mounted troops, artillery, infantry, engineers, and departmental services, according to the nature and circumstances of its population. It is anticipated that a strength of from 20,000 to 25,000 will ultimately be reached.

The Citizen Force Reserve is further subdivided into two classes, A and B. Class A will consist of those who have received military training ; Class B of those who have not received training, but have learnt to use a rifle through the medium of a rifle association.

The National Reserve provides for a very grave emergency, in which every citizen between the ages of 17 and 60 may be required to assist in some way to preserve the integrity of the Union.

It is proposed eventually to establish a Military College for the education of cadets for commissions in the Permanent Force, from amongst whom will be selected the officers required for staff and instructional duties.

The country will be divided into Military Districts, in charge of each of which will be placed a Staff Officer of the instructional and administrative staff. These officers will be charged with the important duties of the registration of all citizens liable for training, the entering of the citizens for training whether voluntarily or by ballot, the organization of units of the Active Citizen Force, the organization of rifle associations, rifle training and practice in these associations, and the organization and training of cadets. They will also give attention to the training in professional subjects of the officers and non-commissioned officers of the Active Citizen Force by arranging lectures and courses of instruction. To the larger districts Adjutants will be appointed to assist further in carrying out these duties.

Since the 1st January 1913, a citizen attaining the age of 17 has three alternatives before him :

1. To enter the Active Citizen Force voluntarily for four years' training.
2. To defer entering the Active Citizen Force voluntarily for 1, 2, 3, or 4 years.
3. To avoid military training if possible.

It is expected that sufficient for requirements will enter voluntarily, but should this not be the case a ballot will be held as follows. The names of all citizens will be registered and classified by the District officer :

Class 1 will consist of those who should find no difficulty, owing to their social position, in undergoing four years' training in the Active Citizen Force.

Class 2 will consist of those whose social position would make it difficult for them to undergo training.

Class 3 will consist of those whose difficulties in undergoing training would be exceptional.

The shortage of numbers in each District will be made good by ballot in June each year from the rolls, each class being exhausted in turn, taking Class 1 first, then Class 2, and finally Class 3.

The Citizen Force and its reserves can be called out for

the prevention or suppression of internal disorder within the Union and for active service anywhere in South Africa.

The Permanent Force is liable for service within or beyond the borders of the Union.

West Africa

The troops stationed in British West Africa consist of :

1 Battalion West India Regiment,
The West African Rifles,
Native Police (armed),

to which must be added some Fortress Engineers and Departmental detachments.

Exclusive of the Native Police, which are not of much military value, these troops amount to about 12,000 officers and men, and are distributed between Gambia, Sierra Leone, the Gold Coast, and Nigeria.

The garrisons are maintained for the protection of the coaling station of Sierra Leone and for the maintenance of internal order and the repression of native risings in British territory.

British possessions in West Africa border on French and German territory, and the situation that might arise should we be at war with either of these Powers requires explanation. Germany maintains but a small garrison in her West African possessions, which can be ignored, but the garrison of French West Africa is nearly double our own. It cannot, however, be reinforced from Algeria owing to the difficulties of the overland communications. So long, therefore, as British naval supremacy is maintained the power of reinforcing the garrisons will ultimately be assured to us and denied to the enemy in the event of war with France. Our military policy is based on the principle of concentration, and we do not lock up more troops in our African possessions than are required for the maintenance of order. Should war with our neighbours in these regions unfortunately occur we must face the possibility of being temporarily inferior to France. A reference to the views expressed on our foreign and

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military policy, in the volume of this series dealing with general imperial topics, will show the degree of risk that we run in this respect.

East Africa

The troops stationed in British East Africa consist of :

The East African Rifles.

Native Police (armed).

The strength of the former, which alone can be considered reliable troops, amounts to some 3,000 officers and men. They are distributed between East Africa, Uganda, and Nyasaland.

The garrison is maintained for similar purposes as in the case of West Africa, and although in this case British and German territory adjoin one another, the strength of the troops in German East Africa does not constitute a serious menace to our interests.

GAZETTEER OF TOWNS

IN BRITISH AFRICAN TERRITORIES

(*Note*.—The towns included in this list have been selected partly on a basis of population, but also, especially in the case of certain smaller towns, with reference to their importance in relation to the localities in which they are situated. The figures for population are in accordance with the latest available returns. The figures for latitude and longitude are approximate.)

Abeokuta, $7^{\circ} 8' \text{ N.}$, $3^{\circ} 25' \text{ E.}$, (Southern) Nigeria, Yoruba country, 64 m. by rail N. of Lagos, on the Ogun River, in the midst of fertile country; trade in palm-oil, timber, rubber, and yams. Pop. 60,000

Accra, $5^{\circ} 34' \text{ N.}$, $0^{\circ} 12' \text{ W.}$, seaport on the Gulf of Guinea and capital of Gold Coast, the sea-terminus of a railway serving the north-eastern districts of the colony, where cacao plantations are situated; seat of an Anglican bishop. Pop. 19,585.

Aliwal North, $30^{\circ} 31' \text{ S.}$, $26^{\circ} 53' \text{ E.}$, Cape Province, on the south bank of the Orange River, 4,300 ft. above sea-level, with dry and bracing climate; 280 m. by rail NNW. of East London. Close to town, hot sulphur springs for rheumatism and skin diseases. Pop. 4,528, of whom 1,884 whites.

Barberton, $25^{\circ} 47' \text{ S.}$, $31^{\circ} 16' \text{ E.}$, Transvaal, 238 m. by rail E. of Pretoria, in the De Kaap Valley, which is rich in minerals. Town owes its existence to gold discovered in 1886. Pop. 2,235, of whom 1,062 whites.

Bathurst, $13^{\circ} 24' \text{ N.}$, $16^{\circ} 36' \text{ W.}$, seaport and capital of Gambia, on St. Mary's Island, which lies at the mouth of the Gambia River near its south bank, and is connected with the mainland by a bridge across Oyster Creek. Pop. 8,000.

Beaufort West, $32^{\circ} 22' \text{ S.}$, $22^{\circ} 34' \text{ E.}$, Cape Province, 339 m. by rail NE. of Cape Town, the largest town in the W. part of the Great Karroo, at the foot of the southern slopes of the Nieuwveld Mts.; favourite resort for invalids; 2,792 ft. above sea-level. Pop. 4,530, of whom 2,043 whites.

Benoni, $26^{\circ} 40' \text{ S.}$, $27^{\circ} 50' \text{ E.}$, Transvaal, 50 m. SW. of Johannesburg, municipality of recent establishment (1907), and rapid growth and progress, situated in the Witwatersrand district; several gold and coal mines within the municipal area. Pop. 41,199, of whom 8,639 whites.

Berbera, $10^{\circ} 26' \text{ N.}$, $45^{\circ} 4' \text{ E.}$, seaport and capital of British Somaliland Protectorate, on a deep bay of the Gulf of Aden, which forms a safe and capacious harbour. Chief exports are: gum and resin, skins, ostrich feathers, sheep, and goats. Imports: cotton goods, rice, flour, sugar, and tobacco. Pop. about 10,000 permanent, but during trade season (Oct.—April) about 30,000.

Bida, $9^{\circ} 5' \text{ N.}$, 6° E. , (Northern) Nigeria, 40 m. by rail NNW. of Baro, on the Niger; terminus of the Northern Nigeria Railway, an important trade and manufacturing centre. Noted for its embossed brass and copper work, especially the beautiful Bida goblets; has glass factory, preparation of indigo, and dyeing establishments. Pop. 80,000.

Blantyre, $15^{\circ} 47' \text{ S.}$, $35^{\circ} 3' \text{ E.}$, chief town of Nyasaland Protectorate, situated

in the Shire Highlands, about 300 m. from the Chinde mouth of the Zambezi; 3,300 ft. above sea-level. Exports: tobacco, coffee, cotton, rubber, and chillies. Founded in 1876, and named after the birthplace of David Livingstone. Pop. 6,000, of whom about 200 whites.

Bloemfontein, $29^{\circ} 8' \text{ S.}, 26^{\circ} 18' \text{ E.}$, capital of Orange Free State, centrally situated in a valley formed by the Bloemspruit, running between a picturesque range of hills to the north and a stony ridge to the south; 4,518 ft. above sea-level; 750 m. by rail NE. by E. of Cape Town. It enjoys a dry healthy climate, and is a favourite resort for invalids, especially those with pulmonary diseases. Mean maximum temperature 76.7° F. , mean minimum 45.8° F. Seat of the Supreme Court of the Union of South Africa, and of an Anglican bishop. Pop. 26,925, of whom 14,720 whites.

Boksburg, $26^{\circ} 15' \text{ S.}, 28^{\circ} 40' \text{ E.}$, Transvaal, 15 m. by rail E. of Johannesburg, centre of the East Rand gold- and coal-mining, the collieries extending 11 m. from the town. Pop. 43,628, of whom 11,529 whites.

Bulawayo, $20^{\circ} 10' \text{ S.}, 28^{\circ} 50' \text{ E.}$, chief town of Southern Rhodesia, in the centre of the table-land between the Zambezi and Limpopo Rivers, 4,469 ft. above sea-level, with a healthy climate; 676 m. by rail from Beira, the nearest seaport; gold-mining in the neighbourhood. About 30 m. SSE. are the famous Matopopo Hills, where Cecil Rhodes is buried. Pop. 10,000, of whom 5,000 whites.

Calabar, $4^{\circ} 56' \text{ N.}, 8^{\circ} 18' \text{ E.}$, seaport, (Southern) Nigeria, on left bank of Calabar River, 5 m. from the Calabar estuary of the Gulf of Guinea; excellent harbour accommodation; exports palm-oil and palm-kernels, and imports cotton goods and gin. The native quarter is known as Duke Town. Pop. 15,000.

Cape Coast, $5^{\circ} 5' \text{ N.}, 1^{\circ} 13' \text{ W.}$, seaport, on the Gulf of Guinea, Gold Coast, built on a low bank and surrounded E. and N. by high ground, and W. by a lagoon; trade in palm-oil. Pop. 11,364.

Cape Town, $33^{\circ} 56' \text{ S.}, 18^{\circ} 28' \text{ E.}$, capital of Cape Province and the seat of the legislature of the Union of South Africa, on the S. shore of Table Bay and surrounded on three sides by mountains: N. by Table Mountain, E. by Devil's Peak, and W. by Lion's Head. The situation of the town and its suburbs, which spread round the bay and encircle the lower spurs of the mountains, is one of the finest in the world. Being situated on one of the principal trade-routes between Europe and the East, Cape Town is of great strategic importance. Its fine harbour can be entered by vessels of the deepest draught. Over half of the exports of Cape Province pass through it, the chief articles being wool and wine. It has a famous astronomical observatory, the most important in the southern hemisphere, and is the seat of Cape University, of an Anglican archbishop, and of a Roman Catholic bishop. Pop. 67,159, of whom 29,863 Europeans; with suburbs 161,579, of whom 85,442 Europeans.

Dongola, $19^{\circ} 10' \text{ N.}, 30^{\circ} 29' \text{ E.}$, Anglo-Egyptian Sudan, on the west bank of the Nile, 45 m. above the Third Cataract, 672 m. by river N. of Khartoum; trading centre of an important agricultural district; on the bank of the Nile opposite the town coal is found. Pop. 10,000.

Durban, $29^{\circ} 52' \text{ S.}, 31^{\circ} 42' \text{ E.}$, principal seaport and largest town in Natal, and one of the finest towns in South Africa, 800 m. by sea NE. of Cape Town, possesses a fine natural land-locked harbour, 8 sq. m. in area, known as Port Natal. The port is provided with the latest facilities for the largest

steamers. The town stretches inland to the north to a range of green hills, and this part is known as 'The Berea'. It has an astronomical observatory. Pop. 69,187, of whom 31,783 white; with suburbs 89,998, of whom 34,880 whites.

East London, 33° 3' S., 27° 55' E., seaport, Cape Province, situated at the mouth of the Buffalo River; the chief seaside resort of the province. East London owes its foundation to the necessities of the Kaffir War of 1846-7, when the British, requiring a port nearer the scene of the war than those then existing, selected this site. Pop. 24,606, of whom 14,899 whites.

El Obeid, 13° 11' N., 30° 14' E., chief town of province Kordofan, Anglo-Egyptian Sudan, situated on the northern foot of Jebel Kordofan, 230 m. SW. of Khartoum; important trade centre, chief articles being gum, ivory, ostrich feathers, and cattle. Pop. 10,000.

Entebbe, 0° 4' N., 32° 27' E., capital of Uganda Protectorate, situated on a peninsula projecting into the Victoria Nyanza; has a good harbour on the lake. Pop. 9,569.

Freetown, 8° 29' N., 13° 10' W., seaport and capital of Sierra Leone, situated on the south side of the Sierra Leone estuary, with a safe and commodious harbour; coaling station for the British Navy. Great trading centre, sea terminus of railway serving the rich palm-oil regions of Mendi-land, and a port of call for all steamers on the West African coast. Seat of an Anglican bishop. Pop. 34,090.

George, 33° 55' S., 22° 26' E., Cape Province, 33 m. by rail NE. of Mossel Bay, and 342 m. E. of Cape Town, situated on the southern slopes of the Outeniqua Mts.; seat of an Anglican bishop. Pop. 3,956, of whom 2,080 Europeans.

Germiston, 26° 12' S., 28° 18' E., Transvaal, 9 m. by rail E. of Johannesburg, situated in the centre of the Witwatersrand mining district; important railway junction. Although a separate municipality, is considered a suburb of Johannesburg. Pop. 54,325, of whom 15,579 whites.

Graaff Reinet, 32° 15' S., 24° 34' E., Cape Province, 185 m. by rail NNW. of Port Elizabeth, situated on the Sunday River, at the foot of the southern slopes of the Sneeuwberg Mts., 2,463 ft. above sea-level. Centre of a prosperous agricultural district, noted for its orchards, vineyards, mohair, wool, and ostrich feathers. Pop. 8,129, of whom 3,904 whites.

Grahamstown, 33° 17' S., 26° 27' E., Cape Province, 106 m. by rail NE. of Port Elizabeth, picturesquely situated at the head of Belmont Valley, sheltered by the surrounding Zuurberg Mts.; 1,760 ft. above sea-level; centre of ostrich farming. Has a university college, and splendid botanical garden; seat of an Anglican and of a Roman Catholic bishop. Pop. 13,830, of whom 7,323 Europeans.

Harrismith, 28° 23' S., 29° 2' E., Orange Free State, 250 m. by rail NW. of Durban, about 20 m. from the western slopes of the Drakensberg Mts., 5,250 ft. above sea-level, health resort, with dry bracing climate; trading centre of a fertile agricultural and pastoral region. Pop. 6,799, of whom 3,447 whites.

Heidelberg, 26° 29' S., 29° 4' E., Transvaal, 42 m. by rail SE. of Johannesburg, situated on the slopes of the Rand, 5,029 ft. above sea-level, and considered the best health resort in the Transvaal; centre of gold-mining and cattle-raising district. Pop. 2,639, of whom 1,522 whites.

Ibadan, $7^{\circ} 23' N.$, $3^{\circ} 49' E.$, (Southern) Nigeria, capital of one of the Yoruba States, and seat of a British resident; 123 m. by rail NE. of Lagos. Pop. 175,000.

Ilorin, $8^{\circ} 40' N.$, $4^{\circ} 45' E.$, (Southern) Nigeria, capital of province of same name, seat of British resident. 160 m. by rail NNE. of Lagos, and 50 m. by rail SSW. of Jebba, on the Niger. Great trading and distributing centre, and has important manufactures of leather goods, shoes, mats, pottery, and carved wooden vessels. Pop. 70,000.

Jagersfontein, $28^{\circ} 45' S.$, $26^{\circ} 10' E.$, Orange Free State, owes its existence to the discovery of diamonds here in 1870, and is noted for its blue-white diamonds which command a high price. It is pleasantly situated on the open veld, 4,500 ft. above sea-level, 70 m. by rail SSW. of Bloemfontein. Pop. 9,019, of whom 1,967 Europeans.

Johannesburg, $26^{\circ} 10' S.$, $28^{\circ} 6' E.$, Transvaal, centre of the Rand gold-mining industry, the most populous city and the commercial capital of South Africa, 957 m. by rail NE. of Cape Town. It lies on the southern slopes of the Witwatersrand and owes its existence to the discovery of gold in the Witwatersrand reefs. Nearly half of the total gold output of the Transvaal is produced here. Seat of the Transvaal University College. Pop. 237,104, of whom 119,953 whites.

Kano, $11^{\circ} 55' N.$, $8^{\circ} 32' E.$, (Northern) Nigeria, capital of province of same name, 540 m. NE. of Lagos, and 400 m. NE. of Baro, at the head of the navigation on the Niger, connected by rail with both places; built on the open plain. Important manufacturing centre, chief articles being weaving of cloth from native-grown cotton, leather goods—most of our morocco leather goods come from Kano—the preparation of indigo, and dyeing. The greatest trading centre of the Central Sudan. Pop. 100,000.

Kassala, $15^{\circ} 28' N.$, $36^{\circ} 24' E.$, Anglo-Egyptian Sudan, situated on the river Mareb, on a plain at the foot of the Abyssinian highlands, 15 m. from the frontier of Eritrea, and 260 m. ESE. of Khartoum. Pop. 20,000.

Khartoum, $15^{\circ} 36' N.$, $32^{\circ} 32' E.$, capital Anglo-Egyptian Sudan, on the left bank of the Blue Nile above its junction with the White Nile, 1,252 ft. above sea-level, 1,356 m. by rail and river S. of Cairo. The new city dates from 1898, when it was taken by Lord Kitchener and became again the capital of the Sudan. Owing to its geographical situation it is the great entrepôt for the trade of the Sudan. It contains the Gordon Memorial College, the chief educational institution of the Sudan. On the right bank of the Nile is **Khartoum North**, connected by a bridge. Pop. 53,520.

Kimberley, $28^{\circ} 45' S.$, $24^{\circ} 59' E.$, Cape Province, on the bare veld, midway between the Modder and Vaal Rivers; 647 m. by rail NE. of Cape Town. It is the centre of the diamond-mining industry of South Africa, and the mines, which are almost entirely under the control of the De Beers Consolidated Company, employ over 2,000 European and 17,000 native workmen. Seat of an Anglican bishop. Pop. (with suburbs) 44,433, of whom 17,507 Europeans.

King William's Town, $32^{\circ} 50' S.$, $27^{\circ} 20' E.$, Cape Province, on the Buffalo River, 42 m. WNW. of East London, at the foot of the Amatola Mts., 1,275 ft. above sea-level; noted educational centre, and also the head-quarters of the colonial forces. Manufactures of sweets, jams, candles, soap, and leather, and trade in wool, hides, and grain. Pop. 9,028 of whom 5,570 Europeans.

Klerksdorp, $26^{\circ} 51' S.$, $27^{\circ} 2' E.$, Transvaal, 116 m. by rail SW. of Johannesburg, situated on the Schoonspruit River near its junction with the Vaal. Centre of gold mines and coalfields, which are beginning to be developed. Pop. 4,220, of whom 2,465 whites.

Kodok (formerly **Fashoda**), $9^{\circ} 53' N.$, $32^{\circ} 8' E.$, Anglo-Egyptian Sudan, a port on the west bank of the Upper Nile, 459 m. by river S. of Khartoum; several roads from Kordofan converge on the Nile at this point. Situated in a very unhealthy locality, and the surrounding country is mostly swampy.

Kroonstaad, $27^{\circ} 30' S.$, $27^{\circ} 19' E.$, Orange Free State, 130 m. by rail SW. of Johannesburg, on the Valsch River, 4,489 ft. above sea-level; favourite resort on account of its dry atmosphere and boating facilities on the river. Important railway junction, and the trading centre of a fertile agricultural and pastoral district, which has also diamond and coal mines. Pop. 5,700, of whom 2,602 whites.

Krugersdorp, $26^{\circ} 9' S.$, $27^{\circ} 40' E.$, Transvaal, 18 m. by rail W. of Johannesburg, on the Witwatersrand, 5,709 ft. above sea-level. Mining centre of some importance, founded in 1887 when gold was discovered on the Rand; railway junction for Mafeking. Celebrated caves are in the neighbourhood. Pop. 55,144, of whom 13,132 whites.

Kuka, $12^{\circ} 55' N.$, $13^{\circ} 34' E.$, (Northern) Nigeria, head-quarters of the British administration in Bornu, $4\frac{1}{2}$ m. from the western shores of Lake Chad, situated in an extensive plain. Pop. 40,000.

Kumasi, $6^{\circ} 34' N.$, $2^{\circ} 12' W.$, capital of Ashanti, Gold Coast, 168 m. by rail N. of Sekondi, lies in a clearing of the dense forest which covers the greater part of the country; the principal distributing centre of Ashanti. Pop. 8,850.

Ladybrand, $29^{\circ} 12' S.$, $27^{\circ} 25' E.$, Orange Free State, 91 m. by rail E. of Bloemfontein, pleasantly situated 4 m. W. of the Caledon River, the boundary of Basutoland, is the trading centre of a rich grain district; coal and petroleum found in the neighbourhood. Pop. 3,323, of whom 1,924 whites.

Ladysmith, $28^{\circ} 35' S.$, $29^{\circ} 49' E.$, third largest town in Natal, 189 m. by rail NW. of Durban, is a railway junction and the chief trading centre of northern Natal; has extensive railway workshops. Pop. 5,595, of whom 2,287 whites.

Lagos, $6^{\circ} 26' N.$, $3^{\circ} 25' E.$, seaport, (Southern) Nigeria, situated on an island in a lagoon, also called Lagos; connected by an iron bridge with the mainland. Large steamers anchor 2 m. from land and goods and passengers are transhipped in smaller boats; works are progressing to transform it into an open port. Seat of an Anglican bishop. Pop. 73,000, of whom 500 Europeans.

Lokoja, $7^{\circ} 40' N.$, $6^{\circ} 45' E.$, (Northern) Nigeria, situated at the junction of the Benue River with the Niger, about 250 m. from the mouth of the Niger, is an important trading centre. Pop. 40,000.

Mafeking, $25^{\circ} 24' S.$, $25^{\circ} 38' E.$, Cape Province, built on the open veld, 4,194 ft. above sea-level, on the Upper Molopo River, 870 m. by rail NE. of Cape Town. Principal trade centre and the head-quarters of the administration of Bechuanaland; chief workshops of the railway between Kimberley and Bulawayo situated here. Pop. 2,297, of whom 1,176 whites.

Malmesbury, $33^{\circ} 29' S.$, $18^{\circ} 38' E.$, Cape Province, 49 m. by rail N. of

Cape Town, is the important trade centre of a large grain-growing and cattle-rearing district. Pop. 3,342, of whom 1,774 whites.

Mengo or Kampala, $0^{\circ} 19' N.$, $32^{\circ} 38' E.$, native capital of Uganda Protectorate, a straggling town built on several steep hills, connected by rail with Kampala Port on Victoria Nyanza, 7 m. to the SE. Pop. 32,441.

Mombasa, $4^{\circ} 4' S.$, $39^{\circ} 43' E.$, principal seaport of East Africa Protectorate, stands on an island situated in a deep arm of the Indian Ocean, and on the channel on either side of the island—named respectively Mombasa and Kilindini. It possesses perhaps the finest harbour on the east coast of Africa. It is a dépôt for the British Navy, and is the sea-terminus of the Uganda railway. Seat of an Anglican bishop. Pop. 30,000, of whom about 200 Europeans.

Mossel Bay, $34^{\circ} 3' S.$, $22^{\circ} 12' E.$, seaport, Cape Province, situated on the W. side of Mossel Bay, 242 m. by sea from Cape Town, and the only port of call for large steamers between the latter and Port Elizabeth; large forwarding trade, and the centre of a large oyster and sole fishery. Pop. 4,486, of whom 1,932 whites.

Nairobi, $1^{\circ} 10' S.$, $36^{\circ} 50' E.$, capital of East Africa Protectorate, situated on the Athi Plains at the foot of the Kikuyu Hills, 5,450 ft. above sea-level, with a delightful climate. Founded in 1899, during the building of the Uganda railway, it became the capital of the Protectorate in 1907. Pop. 14,000, of whom 800 Europeans.

Omdurman, $15^{\circ} 38' N.$, $32^{\circ} 29' E.$, Anglo-Egyptian Sudan, on the west bank of the Nile, immediately north of the junction of the Blue with the White Nile, 2 m. N. by W. of Khartoum. Head-quarters of the native traders of the Sudan, chief articles being ivory, ostrich feathers, and gum arabic; cattle and camel fairs; noted native metal-workers and leather-dressers. Pop. 42,779.

Oudtshoorn, $33^{\circ} 37' S.$, $22^{\circ} 14' E.$, Cape Province, 277 m. by rail WNW. of Port Elizabeth, on the southern slopes of the Great Zwarte Bergen, in an expansive valley crossed by the Olifants River, 1,014 ft. above sea-level; centre of a large horse, cattle, and ostrich-farming district. Pop. 10,930, of whom 5,471 Europeans.

Paarl, $33^{\circ} 49' S.$, $18^{\circ} 3' E.$, Cape Province, 35 m. by rail ENE. of Cape Town, beautifully situated on the Berg River at the foot of the Paarl Mts., has manufactures of wagon- and carriage-building, harness-making, and the production of wine and brandy. Pop. 11,018, of whom 4,921 Europeans.

Pietermaritzburg, $29^{\circ} 46' S.$, $30^{\circ} 13' E.$, usually called Maritzburg, capital of Natal, 71 m. by rail WNW. of Durban, lies in a beautiful situation surrounded by wooded hills. Principal industries are cart- and wagon-building, tanning, creameries, and biscuit factories. Seat of an Anglican bishop, and head-quarters of the Dutch Reformed Church. Pop. 30,555, of whom 14,737 Europeans.

Pietersburg, $23^{\circ} 50' S.$, $29^{\circ} 30' E.$, the most northerly town in Transvaal, 177 m. by rail NNE. of Pretoria, is the centre of a large pastoral and mining district. Pop. 4,547, of whom 1,498 whites.

Port Elizabeth, $33^{\circ} 58' S.$, $25^{\circ} 36' E.$, seaport, Cape Province, situated on W. shore of Algoa Bay; called the Liverpool of South Africa. Exports more colonial produce than all the other ports, principal articles being wool, ostrich feathers, and diamonds. Pop. (with suburbs) 37,063, of whom 20,007 Europeans.

Port Sudan, 19° 37' N., 37° 14' E., chief seaport, Anglo-Egyptian Sudan, on the Red Sea, 495 m. by rail NE. of Khartoum; harbour consists of a series of natural channels and basins. Port Sudan dates from 1905, when the Government selected its site as a more suitable port for the trade of the Nile Valley than Suakin; growing rapidly. Pop. 10,000.

Potchefstroom, 26° 43' S., 27° 30' E., Transvaal, 88 m. by rail SW. of Johannesburg, situated on the Mooi River, near its junction with the Vaal, is the oldest town in the Transvaal. Healthy climate, 4,436 ft. above sea-level, and centre of fine pastoral country; gold mines in the neighbourhood. Pop. 12,989, of whom 8,107 Europeans.

Pretoria, 25° 47' S., 28° 50' E., capital of Transvaal and the seat of the executive of the Union of South Africa, is situated in a plain sheltered by encircling mountains. It is 1,040 m. by rail from Cape Town and is the terminus of the railway from Delagoa Bay (Lorenço Marques). Seat of an Anglican bishop. Pop. (with suburbs) 57,674, of whom 35,942 whites.

Queenstown, 31° 52' S., 26° 52' E., Cape Province, 155 m. by rail NW. of East London, situated on the Upper Valley of the Great Kei River, 3,300 ft. above sea-level; centre of one of the finest farming and sheep-raising districts in South Africa; delightful climate. Pop. 9,028, of whom 3,759 Europeans.

Salisbury, 17° 48' S., 31° 51' E., capital and seat of government of Southern Rhodesia, situated 4,880 ft. above sea-level, with a healthy sub-tropical climate; 374 m. by rail from Beira, the nearest seaport, chief centre of the mining companies of the district; tobacco is grown and general farming flourishes in the neighbourhood. Seat of an Anglican bishop. Pop. 7,600, of whom 3,979 whites.

Sekondi, 4° 57' N., 1° 42' W., seaport on the Gulf of Guinea, Gold Coast, is the sea-terminus of the railway serving Ashanti and the gold-mining districts of the colony; principal exports: gold, rubber, and timber. Pop. 10,000.

Sokoto, 13° 10' N., 5° 20' E., (Northern) Nigeria, capital of province of same name, 220 m. WNW. of Kano, on the Sokoto River, a tributary of the Niger is the religious and political centre of the Fula. Pop. 50,000.

Stellenbosch, 34° S., 18° 45' E., Cape Province, 31 m. by rail E. of Cape Town, is one of the oldest settlements in the province, and an important educational centre; trade centre of a great fruit-growing and wine-making district. Pop. 6,152, of whom 2,704 whites.

Suakin, 19° 7' N., 37° 20' E., seaport, Anglo-Egyptian Sudan, 490 m. by rail NE. of Khartoum, stands on an island, and is connected with the mainland by a causeway and viaduct. Until 1906 the chief port of the Sudan, it has been superseded by Port Sudan, situated 36 m. to the north. Pop. 10,500.

Uitenhage, 33° 47' S., 25° 23' E., Cape Province, 21 m. by rail NW. of Port Elizabeth, situated in the valley of the Zwartkops River. Has large railway workshops, wool-washing establishments, and flower and fruit nurseries. Pop. 11,573, of whom 6,224 whites.

Umtali, 19° 50' S., 32° 45' E., Southern Rhodesia, situated on the frontier of Portuguese East Africa, 170 m. by rail from Beira, the nearest seaport, centre of an agricultural and rapidly developing mining district. Pop. about 1,000 whites.

Utrecht, 27° 38' S., 30° 11' E., Natal, 301 m. by rail NW. of Durban. is

built in a hollow among the foothills of the Drakensberg Mts.; extensive coalfields in the neighbourhood. Pop. 976, of whom 541 whites.

Vryheid, 27° 40' S., 30° 42' E., Natal, 291 m. by rail NW. of Durban, is the centre of a district rich in gold, copper, and coal; considerable wattle plantations in the neighbourhood. Seat of an Anglican bishop. Pop. 1,956, of whom 1,061 whites.

Wad Medani, 14° 24' N., 33° 31' E., Anglo-Egyptian Sudan, 110 m. by rail SE. of Khartoum, on the left bank of the Blue Nile, active trade centre, being on the main route from Abyssinia to Khartoum; soap factories. Pop. 20,000.

Worcester, 33° 40' S., 19° 22' E., Cape Province, 109 m. by rail NE. of Cape Town, beautifully situated in the Little Karroo, at the foot of the Hex Mountain; centre of district noted for wine, brandy, cereals, and ostrich feathers, and has leather and wagon-building manufactories. Pop. 7,961, of whom 3,370 whites.

Yola, 9° 12' N., 12° 40' E., (Northern) Nigeria, capital of province of same name, situated on the south bank of the Benue River, 480 m. by river E. from Lokoja. Pop. 25,000.

Zaila, 11° 30' N., 43° 40' E., seaport, British Somaliland Protectorate, 124 m. SW. of Aden, serves as the port for Harrar, the emporium of trade of Southern Abyssinia. Exports coffee, skins, ivory, mother-of-pearl, and cattle. Pop. 7,000.

Zaria, 11° 10' N., 7° 45' E., (Northern) Nigeria, native capital of province of same name, 87 m. by rail SW. of Kano, 2,150 ft. above sea-level, is one of the healthiest places in the territory. Great trading centre, connected by rail with Baro, situated at the head of the permanently navigable portion of the Niger. Pop. 65,000.

Zungeru, 9° 48' N., 6° 9' E., (Northern) Nigeria, on the Kaduna River, 450 ft. above sea-level, 180 m. by rail SW. of Kano and 120 m. by rail NNW. of Baro, on the Niger. Its site was selected in 1901, and the town soon developed and has much of the appearance of an English residential town. Pop. 8,000.

NOTE TO STATISTICS ON FOLLOWING PAGES

Trade with Principal Countries.

Theoretically the imports of one country from another should coincide with the exports of the country from which they purport to be consigned to the importing country, in reality freight, insurance and other charges, together with a lack of uniformity in the date on which the Customs year begins, the diversion of goods exported when *en route*, variations in methods of valuation and the consideration of ships' stores and bunker coal, &c., render comparison impracticable.

H. Y. = Highest Year, *i. e.* the year in which returns were highest during the period for which averages are quoted.

STATISTICS

BY HAROLD MACFARLANE

SOUTH AFRICA

	AREA	<i>sq. m.</i>	<i>Relation to area of U.K., taking the U.K. as 1.</i>
Cape of Good Hope		276,995	2·282
Natal		35,371	0·291
Orange Free State		50,392	0·415
Transvaal		110,426	0·909
		473,184	3·8979

LAND CULTIVATED. Census 1911 (1,000 acres)

	<i>Un. S. Afr.</i>	<i>Cape.</i>	<i>Natal.</i>	<i>Transv.</i>	<i>Orange F.S.</i>
Under cultivation	6,930	2,056	1,016	2,016	1,842
Lying fallow	1,885	795	225	470	395
Grazing	189,884	122,568	9,064	30,184	28,068
Vineyards	36·4	34·8	—	1	0·6
Orchards	77	38·2	4·2	15·9	18·7
Vegetable gardens	22·2	12·56	1·2	4·34	4·1

LAND UNDER PRINCIPAL CROPS. Census 1911 (1,000 acres)

Mealies	2,283	244	233	897	909
Oats	810	504	17	103	186
Wheat	804	489	2·3	74	238·7
Kaffir corn	167	19·5	8·5	53	86
Lucerne	155·7	129·2	2·7	14·3	9·5
Barley	108	90·5	2·5	6·0	9
Rye	108	91	0·8	0·6	15·6
Sugar cane, for cattle food	7·6	—	5·9	1·5	0·2
Sugar cane, for sugar	64·8	—	64·6	0·2	—
Potatoes	61·6	20·7	8·6	19·0	13·3
Paspalum and other grasses	59	15	25	11	8

Other crops grown in Un. S. Afr. are as follows—1,000 ac. : pumpkins, 40 ; tobacco, 19·2 ; manna, 16·4 ; sweet potatoes, 13·5 ; peas and beans, 11·4 ; mangel and beet, 5 ; tea (all grown in Natal), 5 ; onions, 4·4 ; ground-nuts, 1·4.

AGRICULTURAL PRODUCTS. Census 1911. Thousands

Mealies (tons)	770	154·2	161·2	295·5	159·1
Oats (tons)	138	82·3	2·9	10·4	42·4
Oat hay (tons)	226	131·5	4·3	48·3	41·9
Wheat (tons)	161·6	116·5	0·6	23·6	20·9
Kaffir corn (tons)	138	26·7	53·0	41·3	17·0
Lucerne (tons)	123	100	5	10	8
Barley (tons)	29·12	26·68	0·2	0·88	1·36
Barley, cut-green (bundles)	8,828	5,050	419	2,236	1,123
Rye (tons)	18·1	15·12	0·07	0·11	2·8
Sugar cane, cattle food (tons)	38·3	0·4	36·4	1·3	0·2
Sugar cane, for sugar	1,095·2	—	1,095	0·2	—
Potatoes	82·2	27·7	13·6	27·5	13·4
Paspalum and other grasses (tons)	20·6	6·9	4·4	8	1·3

Other products are as follows—in thousands : pumpkins, 16,727 ; tobacco (lb.), 14,961 ; manna (tons), 17·2 ; sweet potatoes (tons), 42·6 ; peas and beans (tons), 24·9 ; mangel and beet (tons), 73 ; tea (lb.), 5,010 ; onions (tons), 7 ; ground-nuts (tons), 1·9.

VINEYARDS

	<i>Un.</i> <i>S. Afr.</i>	<i>Cape.</i>	<i>Natal.</i>	<i>Transv.</i>	<i>Orange</i> <i>F.S.</i>
Total grape crop, 1,000 bush. baskets					
Brandy made (1,000 gal.)	5,754	5,696	3	27	28
Wine made (1,000 gal.)	621·5	617	—	4·5	—
	5,468	5,463·3	0·3	4·4	—

	ORCHARDS.	Principal Crops.	Census year 1911.	Millions	
Peach	.	433	176	19·4	155·9
Apricot	.	134·5	84·8	4·4	28·1
Orange	.	119·9	70·5	15·9	32·5
Apple	.	98·4	74·3	6·1	9·9
Plum	.	77	58·4	6·5	8·3
Banana	.	61·4	4·0	56·9	0·5

OTHER PASTORAL PRODUCTS. Census year 1911. Thousands

Wool (lb.)	104,654	55,800	4,811	9,754	34,289
Mohair, Angora (lb.)	13,984	12,224	186	439	1,135
Hides: cattle (no.)	352	156	138	19	39
Skins: sheep (no.)	3,350	1,958	76·7	189·5	1,125·8
Skins: goats (no.)	1,122·5	937·5	39·5	60	85·5
Horns (no.)	273·4	92·9	173·7	30	3·8
Ostrich feathers (lb.)	565	556·7	2·6	1·8	3·9
Milk sold (gals.)	5,233	2,490	955·5	1,111	676·5
Butter (lb.)	11,349·3	4,954·5	1,548·6	1,019·2	3,827
Cream (lb.)	10,085	2,190·3	1,068·4	720·3	6,106
Cheese (lb.)	545·3	414·3	15·7	14·3	101
Fat and tallow (lb.)	679·9	511	15·6	72·0	81·3
Soap (lb.)	1,290	628	25	205	432
Honey (lb.)	108·5	100·7	2·1	3·4	2·3

LIVE-STOCK. Census Year 1911

	<i>Cattle.</i> 1,000.	<i>Horses.</i> 1,000.	<i>Ostriches.</i> 1,000.	<i>Sheep.</i> 1,000.	<i>Pigs.</i> 1,000.	<i>Poultry.</i> 1,000.
Un. S. Afr.	5,796·9	719·4	746·7	30,656·7	1,081·6	10,533·9
Cape	2,715·3	333·9	728	17,134·5	505·7	4,590
Natal	456	75·6	4·1	1,519·2	110·3	1,530
Transv.	1,339·3	89·1	5·4	3,415·2	302·9	2,719
Orange F.S.	1,286·2	220·7	9·1	8,587·6	162·6	1,694

Increase or decrease % in intercensal period 1904-11

Un. S. Afr.	+ 65·61	+ 60·03	+ 106·9	+ 87·82	+ 59·27	+ 66·88
Cape	+ 38·94	+ 30·93	+ 103·4	+ 44·98	+ 31·04	+ 18·22
Natal	- 31·61	+ 13·51	+ 169·9	+ 127·31	+ 45·39	+ 24·08
Transv.	+ 159·58	+ 72·61	+ 38,764·29	+ 308·65	+ 94·35	+ 377·6
Orange F.S.	+ 254·14	+ 189·47	+ 587·6	+ 186·3	+ 164·87	+ 170·13

Number of animals to sq. m.

Un. S. Afr.	12·25	1·52	1·58	64·8	2·29	22
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WOODS AND FORESTS

PRINCIPAL PRODUCTS. Wood cut, census return 1911, 1,000 c. ft.

	<i>Un. S. Afr.</i>	<i>Cape.</i>	<i>Natal.</i>	<i>Transv.</i>	<i>Orange F.S.</i>
Assegai	635	628·4	5·2	1·4	—
Iron wood	1,254	1,245	9	—	—
Pear (white)	423	422	0·5	0·5	—
Yellow wood	4,741	4,719·5	17	4·5	—
Other wood	6,936	1,718·5	1,079·6	4,042·4	95·5

PROGRESS OF MINING

CAPE

<i>Av. of years.</i>	<i>Gold.</i>				<i>Copper.</i>		
	£1,000.	<i>H. Y.</i>	£1,000.		£1,000.	<i>H. Y.</i>	£1,000.
1897-1901	0.41	1909	0.5		416 ¹	1901	571
1902-6	0.35	1906	1.1		372	1906	497
1907-11	1.06	1907	2.4		473	1907	602

¹ Domestic exports.*Coal.*

<i>Av. of years.</i>	1,000 tons.	£1,000.	<i>H. Y.</i>	£1,000.	£1,000.	<i>H. Y.</i>	£1,000.
1897-1901	166	135	1901	180	3,975	1898	4,015
1902-6	155	149	1903	178	5,079	1906	6,993
1907-11	99	78	1907	119	5,004	1907	6,311

*Diamonds.*¹¹ Product. in Kimberley dist., 1897-1905 inclu.; later years, product. of entire prov.*Tin.*

<i>Av. of years.</i>	<i>Ore, tons.</i>	£1,000.	<i>H. Y.</i>	£1,000.
1907-11	51	4.7	1907	14.4

NATAL

<i>Av. of years.</i>	<i>Gold.</i>				<i>Coal.</i>		
	£1,000.	<i>H. Y.</i>	£1,000.	1,000 tons.	£1,000.	<i>H. Y.</i>	£1,000.
1897-1901	0.22	1901	0.60	354	245	1901	549
1902-6	0.22	1905	0.46	907	476	1906	524
1907-11	6.88	1910	17.77	1,934	695	1908	737

ORANGE FREE STATE

<i>Av. of years.</i>	<i>Diamonds.</i>				<i>Coal.</i>		
	£1,000.	<i>H. Y.</i>	£1,000.	1,000 tons.	£1,000.	<i>H. Y.</i>	£1,000.
1903-6	677	1905	938	146 ¹	65	1906	85
1907-11	1,296	1911	1,611	437	136	1908	145

¹ 1904-6.

TRANSVAAL

<i>Av. of years.</i>	<i>Gold.</i>				<i>Coal.</i>		
	£1,000.	<i>H. Y.</i>	£1,000.	1,000 tons.	£1,000.	<i>H. Y.</i>	£1,000.
1897-1901	9,185	1898	16,241	1,769	485	1898	668
1902-6	16,283	1906	24,606	2,098	815	1904	884
1907-11	31,073	1911	35,041	3,185	898	1911	1,020

Silver.

<i>Av. of years.</i>	£1,000.	<i>H. Y.</i>	£1,000.	£1,000.	<i>H. Y.</i>	£1,000.
1902-6	49	1906	83	737	1906	1,563
1907-11	91	1911	98	1,588	1907	2,268

*Diamonds.**Copper.*

<i>Av. of years.</i>					<i>Tin ore, &c.</i>		
	£1,000.	<i>H. Y.</i>	£1,000.	tons.	£1,000.	<i>H. Y.</i>	£1,000
1906	—	—	—	97	9.1	—	—
1907-11	50	1910	76	2,195	223	1911	411

Mineral Output of S. Africa, 1870-1911 (in £1,000).—Gold, 330,500; diamonds, 149,600; coal, 23,500; tin, 1,152; copper, 8,580; all other minerals, 5,000. Total, 518,332.

Av. no. of persons at work (1911).—Gold mines: whites, 25,500; natives and others, 186,000. Diamond mines: whites, 4,500; natives, 34,800. Coal mines: whites, 1,220; natives and others, 20,000.

MINERAL PRODUCTION (av. 1906-10)

	<i>Cape.</i>	<i>Natal.</i>	<i>Trans.</i>	<i>Orange F.S.</i>
Asbestos (value £1,000)	17·2	—	—	—
Coal (1,000 tons)	109·1	1,704	2,926	439
Value £1,000	90·8	655	861	134
Copper ore (1,000 tons)	98·5	—	1·4	—
Value £1,000	471·6	—	46·1	—
Diamonds (1,000 carats)	2,405	—	1,824	575
Value £1,000	5,270	—	1,577	1,211
Gold (1,000 oz.)	0·238	1·4	6,825	—
Value £1,000	1·4	6·1	28,991	—
Salt (value £1,000)	38	—	0·6	22·2
Tin ore (1,000 tons)	0·05	—	1·5	—
Value £1,000	4·5	—	144·5	—
Silver (1,000 oz.)	—	—	761	—
Value £1,000	—	—	88·3	—
Av. val. of all minerals (£1,000)	5,895	661·4	32,075·3	1367·3

FISHERIES. Census 1911

Total value of catch, Un. S. Africa, £170,100 (Cape, £156,600; Natal, £22,500). No. of vessels employed, 633 (Cape, 576; Natal, 57). Fishermen, 3,884 (Cape, 3,238; Natal, 646).

INDUSTRIES. Census 1911

	<i>Cape.</i>	<i>Natal.</i>	<i>Transv.</i>	<i>Orange F.S.</i>
Total no. of establishments	1,266	350	693	164
Total no. of employés	21,553	27,096	15,533	1,734
Salaries and wages (£1,000)	1,520	1,134	1,453	101
Value of mach., land, and buildings (£1,000)	5,005	4,274	5,379	628
Value of materials used (£1,000)	4,535	2,311	2,085	458
Value of art. produced (£1,000)	7,432	4,434	4,633	749

CHIEF INDUSTRIES BY PROVINCES

The Cape

	<i>No.</i>	<i>Employés.</i>	<i>Salaries.</i>	<i>Mat. used.</i>	<i>Art. prod.</i>
			£,1000.	£1,000.	£1,000.
Grain and mealie mills	133	1,239	97	1,258	1,578
Bread, biscuits, &c., works	93	1,713	104	481	703
Distillers	32	606	43	387	542
Tobacco industry	27	1,109	67	347	492
Arms and explosives	3	938	108	403	632

Natal

Grain and mealie mills	40	515	19·6	274	379
Sugar refineries	31	13,229	235·7	887	1,621
Mechan. and elec. eng. works, iron and brass foundries	18	3,552	382·9	248	764

Transvaal

Bread, biscuit, and confection	54	814	81·5	325	483
Breweries	8	863	124·1	121	573
Builders and contractors	30	987	123·4	230	394
Printing, bookbinding, &c.	46	1,046	225·5	116	427
Lighting	4	1,997	156	120	569

Orange Free State

Curing fact. and dairy prod.	10	143	13	142	181
Grain and mealie mills	56	353	21	262	340

IMPORTS AND EXPORTS

A. of years.	Natal.			Cape.			Orange F. S.			Transv.		
	H. Y.			H. Y.			H. Y.			H. Y.		
	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.
1897-1901	6,993	1901	10,188	19,511	1901	23,992	—	—	—	—	—	—
1902-6	12,461	1903	16,222	25,780	1903	34,685	3,143 ¹	1906	3,861	17,127	1903	21,795
1907-9	7,666	1909	8,226	14,729	1907	15,600	3,427	1907	3,673	17,200	1909	19,644
<i>Union of S. Africa</i> (av. 1910-12), £38,940,000. Highest Year, 1912, £39,845,000.												

Note.—Inclusive of value of goods in transit for the interior, but in years prior to 1910 imports via Natal or the Cape in transit to other places in S. Africa were included in the figures shown for those provinces *as well as* in those of final destination. For 1905 and prior years, overland trade is excluded from the figures for Natal, but partly included in those for the Cape, whilst those for 1906-9 represent imports by sea, exclusive of inter-state trade. From 1910 the Union figures include imports overland (other than gold in transit) from other places in S. Africa.

¹ Excluding bullion and specie, 1902-3-4-5.

A. of years.	Natal.			Cape.			Orange F. S.			Transv.		
	H. Y.			H. Y.			H. Y.			H. Y.		
	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.
1897-1901	1,584	1901	2,068	17,933	1898	25,319	—	—	—	—	—	—
1902-6	3,955	1902	3,654	29,157	1906	49,498	1,648 ¹	1906	3,349	17,635	1906	27,206
1907-9	3,468	1909	3,951	44,425	1909	46,599	4,027	1909	4,777	32,907	1909	34,129
<i>Union of S. Africa</i> (av. 1910-12), £58,173,000. Highest year, 1912, £63,273,000.												

Note.—The value of exports via Natal and Cape for the inland provinces is included in the figures for those as well as in those for the maritime provinces. The value of gold in transit from places outside the Union for shipment is excluded from the Union figures from 1910 inclusive, but included in previous years. The figures given for Natal and the Cape for 1906-9 represent exports by sea, exclusive of inter-state trade, which was previously included. From 1910 inclusive the Union figures include exports overland to other places in S. Africa.

¹ Excluding bullion and specie, 1902-5 inclusive.

PRINCIPAL ARTICLES IMPORTED (av. of years, 1909-10-11)

	<i>Un.</i> <i>S. Afr.</i> £1,000.	<i>Brit.</i> <i>S. Afr.</i> ¹ £1,000.	% of <i>total.</i>	<i>Brit. S. Afr.</i> <i>H. Y. 1910.</i> £1,000.
Machinery . . .	3,119	3,276	8.97	4,061
includ. mining mach.	1,057	1,129	3.09	1,335
„ electrical mach.	545	552	1.51	834
Cotton goods . . .	2,671	2,753	7.54	2,866
Apparel . . .	2,337	2,388	6.54	2,486
Haberdashery . . .	1,763	1,773	4.86	1,915
Specie, gold . . .	1,450	1,474	4.04	1,991
Iron and steel manuf. .	1,230	1,290	3.53	1,537
Railway material . . .	1,151	1,366	3.74	1,845
Boots and shoes . . .	1,095	1,108	3.03	1,211
Grain . . .	1,002	1,017	2.79	1,044
including wheat . . .	685	685	1.88	747
Wood and timber . . .	852	884	2.42	1,071
Woollen goods . . .	781	785	2.15	853
Paper and stationery .	727	743	2.03	761
Meal and flour . . .	656	674	1.85	723
Coffee . . .	552	556	1.52	519
Electrical materials .	548	556	1.52	690
Drugs and chemicals .	504	534	1.46	532
Fencing . . .	490	500	1.37	552

¹ These particulars represent the imp. into Brit. S. Afr., exclud. inter-state trade (i.e. trade between the various colonies and territories which formerly belonged to the Customs Union, viz. the Un. of S. Afr. (comprising the Cape, Natal, Orange F.S., and Transv.), S. and NW. Rhodesia, Basuto land, Bechuanaland Protectorate, and Swaziland).

PRINCIPAL ARTICLES EXPORTED (av. of years, 1909-11). H.Y. 1911

Bullion, gold, raw . .	32,536	35,108	63.62	37,626.5
Diamonds . . .	7,711	7,711	13.98	8,282.9
Wool . . .	3,820	3,820	6.92	3,900
Ostrich feathers . . .	2,206	2,206	3.99	2,253
Hides and skins . . .	1,204	1,206	2.18	1,201
Coal . . .	968	968	1.75	1,088
Angora hair . . .	894	894	1.62	917.8
Grain . . .	623	634	1.15	432
including maize . . .	586	597	1.08	419.5
Copper . . .	528	554	1.00	643

RAILWAYS (see also p. 135)

Av. of four years, 1908-11. Union of S Africa Gov. Railways, length in 1911: Cape, 3,397 m.; Natal, 1,053 m.; Transvaal, 2,020 m.; Orange Free State, 1,077 m. Total, 7,547. Capital expend. to end of 1911, 77½ mill. sterl. Av. no. of train miles run, 21.8 mill. Av. no. of passengers carried, 31.7 mill. Av. tonnage (avoir.) of goods carried, 9.89 mill. Av. no. of live stock carried, 2.5 mill. Av. receipts: (a) coaching, £3,050,000; (b) goods and coal, £7,155,000; (c) live stock, £358,000; (d) miscellaneous, £281,000. Total, £10,844,000. Av. working expend.: (a) maintenance of way, works, and equipment, £2,230,000; (b) running expenses, £1,632,000; (c) traffic expenses, £1,370,000; (d) general charges, £307,000; (e) contributions to renewal fund, £668,000. Total, £6,297,000. Av. earnings per train m., 9s. 11.4d; per m. of line open, £1,560 5s. Av. expend. per train m., 5s. 0.6d; per m. of line open, £907.25.

The private lines comprise 485 m. in the Cape of Good Hope Province, 50 m. in Natal (leased by the Gov.), 6 m. in the Transvaal, and 4 m. in Orange Free State.

TRADE WITH PRINCIPAL COUNTRIES* (Average, 1909-10-11)

IMPORTS

	<i>Un. of S. Afr. £1,000.</i>	<i>% of total.</i>	<i>H. Y. 1910. £1,000.</i>	<i>Brit. S. Afr. (exclud. inter-state trade).</i>		
				<i>£1,000.</i>	<i>% of total.</i>	<i>H. Y. 1910. £1,000.</i>
United Kingdom . . .	20,842	59.07	24,002.5	21,609.5	59.21	24,725
Australia . . .	2,028.1	5.76	1,898.4	2,042	5.59	1,907
British India . . .	851.6	2.42	840.7	878	2.40	868
Canada . . .	579.0	1.64	632.0	595	1.63	648
British Empire	24,849	70.43	27,939.5	25,682.5	70.36	28,726
Foreign countries :						
Germany . . .	3,118	8.85	3,523	3,212	8.8	3,630
United States . . .	2,607	7.41	2,731	2,686	7.36	2,809
Sweden . . .	593	1.67	682	624	1.71	714
France . . .	525	1.48	548	541	1.48	565
Holland . . .	523	1.48	531	532	1.45	538
Belgium . . .	514	1.45	581	677	1.85	735
Brazil . . .	501	1.42	478	501	1.37	478
Port. E. Africa . . .	487	1.37	335	540	1.48	400
All foreign countries	10,338	29.3	10,888.5	10,822	29.64	11,379
Imp. from S. and NW. Rhodesia . . .	92	0.27	112	—	—	—
Total av. imports . . .	35,279	100	38,940	36,504.5	100	40,105

EXPORTS (Highest Year, 1911)

United Kingdom . . .	47,443	88.55	50,786.3	50,145	90.88	53,479
British Possessions . . .	245	0.46	239.2	252	0.46	250
British Empire . . .	47,688	89.01	51,025.5	50,397	91.34	53,729
Foreign countries :						
Germany . . .	1,714	3.2	1,581	1,719	3.12	1,586
Belgium . . .	589	1.1	558	603	1.09	597
United States . . .	423	0.79	467	465	0.86	509
Other for. countries	704	1.31	844.5	1,004	1.82	1,335
Total for. countries . . .	3,430	6.4	3,450.5	3,791	6.89	4,027
Ships' stores and Parcel Post . . .	975	1.82	1,154	977	1.77	1,161
Removals to S. and NW. Rhodesia . . .	1,476	2.77	1,678	—	—	—
Total exports . . .	53,569	100	57,308	55,165	100	58,917

* 'Countries of origin' and 'countries of destination'.

CHIEF IMPORTS FROM PRINCIPAL COUNTRIES (av. 1910-12)
£1,000.

United Kingdom.—Apparel, 2,426; cotton piece goods, 1,321; haberdashery, various, 1,178; boots and shoes (men's, 612; women's, 313), 925; mining machinery, 654; hosiery, 461; woollen goods, blankets and rugs, 365; galvanized and corrugated iron, 358; condensed milk, 288; woollen goods, cloth and piece, 288; iron and steel pipes and piping, 256; cotton rugs and blankets, 254; whisky, 252; motors, 240; iron and steel bars, bolts, and rods, 237; books, 228; glycerine for manufactures, 219; cycles, 215.

British Possessions.—*Australia*: wheat, 507; flour, 351; butter, 119. *Canada*: flour, 226. *Ceylon*: tea, 159. *India*: bags (coal, flour, and grain), 275; rice, 254. *Mauritius*: sugar, 211.

Foreign Countries.—*Belgium*: fencing standards, 78. *Brazil*: coffee, 590. *Chili*: nitrates, 213. *France*: articles of food and drink, 200 (brandy, 64); haberdashery, various, 86. *Germany*: electrical mach., 345; haberdashery, various, 245; cyanide of sodium, 233; cotton piece goods, 189; musical instruments, 104; zinc, unmanufactured, 101. *Holland*: glycerine, 220; cheese, 115. *Norway*: preserved fish, 40. *Port. E. Africa*: sugar, 69. *Sweden*: pinewood, 265; flooring and ceiling, 132. *Switzerland*: haberdashery, various, 82. *United States*: paraffin oil, 264; agricultural implements, various, 193; lubricating oils, 104; pinewood, 99; paraffin wax, 702; agricultural machinery, 70.

CHIEF EXPORTS TO PRINCIPAL COUNTRIES (av. 1910-12)
£1,000.

United Kingdom: gold, 35,065; diamonds, 8,549; wool in grease, 2,159; ostrich feathers, 1,960; Angora hair, 921; sheepskins, 539; hides, ox and cow, 429; copper, regulus and smelted, 370; goatskins, 238; maize, 192; tin ore, 167; wool scoured, 128; bark, 127.

Straits Settlements: tin ore, 55.

Foreign Countries.—*Belgium*: wool, in grease, 353; maize, 148; diamonds, 67; wool, scoured, 23. *France*: wool, in grease, 97. *Germany*: wool, in grease, 1,249; wool, scoured, 119; bark, 100; maize, 88. *United States*: ostrich feathers, 342; sheepskins, 69.

SHIPPING ¹

NATAL.				CAPE OF GOOD HOPE. ²			
Av. of years.	1,000 tons.	H. Y.	1,000 tons.	1,000 tons.	H. Y.	1,000 tons.	1,000 tons.
1897-1901	2,843	1901	3,594	7,398	1901	9,979	
1902-6	4,303	1905	5,026	10,356	1902	12,512	
1907-9	5,436	1909	6,238	5,639	1907	5,813	

¹ Includ. inter-prov. shipping (i.e. between Cape and Natal) to close of 1909.

² From 1897 to 1906 inclus. the Cape statistics represent gross tonnage so far as steam vessels were concerned. The av. tonnage of steam vessels, 1897-1901, was 6,494,000; 1902-6, 9,569,000.

UNION OF SOUTH AFRICA (exclus. of inter-prov. shipping)

Av. of years	Net tonnage. 1,000 tons.	H. Y.	1,000 tons.	British vessels (av.). 1,000 tons.	% of total
1910-12	10,376	1911	10,856	8,440	81.3

Of the remaining nationalities German vessels account for 14% of the net tonnage and Norwegian for 2%.

Principal Ports.—Durban (av. tons entered and cleared 1910-12), 8,036,000; Cape Town, 6,927,000; Port Elizabeth, 3,746,000; East London, 3,403,000; Mossel Bay, 1,661,000.

Vessels on Register (av. 1907-11).—Natal, 27 vessels, net tonnage 2,076; Cape Town, 54 vessels, net tonnage 6,406.

POPULATION

	<i>Cape.</i> 1,000.	<i>Natal.</i> ³ 1,000.	<i>Transv.</i> 1,000.	<i>Orange F. S.</i> 1,000.
1881	721 ¹	403	—	—
1891	1,527 ²	544	—	—
1904	2,410	1,109	1,270	387
1911	2,565	1,194	1,686	528

¹ Pop. of colony proper accord. to Cen. of 1875, exclud. pop. of Transkei and Griqualand.

² Exclud. of pop. of Pondoland and British Bechuanaland, annexed to the Cape in 1894 and 1895.

³ Including Zululand after 1891.

Immigration and Emigration.—Natal (av. 1907-11), immigrants, 19,640; emigrants, 28,800. Cape of Good Hope (av. 1907-11), immigrants, 31,300; emigrants, 32,400.

Particulars in respect to Orange Free State and Transvaal are not available.

CENSUS OF S. AFRICA, 1911

UNION OF S. AFRICA.			CAPE OF GOOD HOPE.			NATAL.		
<i>Total population.</i>								
<i>Persons.</i>	<i>Males.</i>	<i>Females.</i>	<i>Persons.</i>	<i>Males.</i>	<i>Females.</i>	<i>Persons.</i>	<i>Males.</i>	<i>Females.</i>
5,973,394	3,069,392	3,904,002	2,564,965	1,255·6	1,309·3	1,194,043	564·6	629·4
% of increase or decrease in intercensal period 1904-11.								
+ 15·41	+ 14·43	+ 16·46	+ 6·44	+ 3·01	+ 9·94	+ 7·69	+ 2·55	+ 12·77
<i>European or white.</i>								
1,276,242	685,164	591,078	582,377	301·2	281·1	98,114	52·5	45·6
% of increase or decrease in intercensal period 1904-11.								
+ 14·28	+ 7·88	+ 22·71	+ 0·45	- 5·42	+ 7·62	+ 1·03	- 7·51	+ 13·06
<i>Others.</i>								
4,697,152	2,384,228	2,312,924	1,982,588	954·4	1,028·1	1,095,929	512·1	583·8
% of increase or decrease in intercensal period 1904-11.								
+ 15·72	+ 16·47	+ 14·96	+ 8·33	+ 6	+ 10·6	+ 8·33	+ 3·7	+ 12·75
TRANSVAAL.			ORANGE FREE STATE.					
<i>Persons.</i>	<i>Males.</i>	<i>Females.</i>				<i>Persons.</i>	<i>Males.</i>	<i>Females.</i>
	1,000.	1,000.					1,000.	1,000.
1,686,212	971·5	714·6				528,174	277·5	250·6
% of increase or decrease in intercensal period 1904-11.								
+ 32·78	+ 38·29	+ 25·96				+ 36·37	+ 32·09	+ 41·44
<i>European or white.</i>								
420,562	236·9	183·6				175,189	94·48	80·70
% of increase or decrease in intercensal period 1904-11.								
+ 41·47	+ 32·91	+ 54·28				+ 22·79	+ 15·84	+ 32·06
<i>Others.</i>								
1,265,650	734·6	531				352,985	183·03	169·95
% of increase or decrease in intercensal period 1904-11								
+ 30·12	+ 40·11	+ 18·44				+ 44·29	+ 42·41	+ 46·37

PROPORTION OF RACES

	<i>Un. S. Afr.</i> %	<i>Cape.</i> %	<i>Natal.</i> %	<i>Transv.</i> %	<i>Orange F. S.</i> %
European or white	21.37	22.71	8.22	24.94	33.17
Others	78.63	77.29	91.78	75.06	66.83

Sexes. No. of Females to every 100 Males

All races	95	104	111	74	90
European or white	86	93	87	78	85
Others	97	108	114	72	93

Density of Population, &c.

Area in sq. m.	473,100	276,995	35,290	110,426	50,389
Pop. per sq. m.	12.63	9.26	33.83	15.27	10.48
Inhab. dwellings per sq. m.	2.76	1.91	9.3	3.16	2.0

Density of Races. No. of Persons of each Race to the sq. m.

European or white	2.7	2.10	2.78	3.81	3.48
Others	9.93	7.16	31.05	11.46	7

Urban and Rural Population

Urban (1,000)	1,477.8	619.5	153	599.5	105.8
Rural (1,000)	4,490.2	1,943	1,040	1,085.5	421.4

RELIGIONS

<i>Christian.</i>	<i>Un. S. Afr.</i> 1,000.	<i>% of</i> <i>total.</i>	<i>Cape.</i> 1,000.	<i>Natal.</i> 1,000.	<i>Transv.</i> 1,000.	<i>Orange F. S.</i> 1,000.
All Christians	2,730.7	45.70	1,437.7	246.1	696.8	350.0
Including :—						
Dutch Churches	898.6	15.04	479.8	14.7	228.7	175.3
Methodists	599.6	10.04	304.4	77.5	120.9	96.5
Anglican Communion	532.5	8.91	282.6	66.3	141.1	42.4
Lutherans	219.1	3.67	77.8	24.5	107.8	8.7
Independ. or Congreg.	187.4	3.14	147.3	12.4	19.2	8.5
Presbyterian	130.7	2.19	74.0	17.8	31.4	7.5
Catholics	93.0	1.55	35.9	22.6	28.7	5.7
<i>Non-Christian.</i>						
Non-Christians	212.8	3.58	43.8	126.5	39.6	2.9
Including :—						
Jews	46.9	0.79	16.7	1.5	25.9	2.8
Hindus	115.7	1.94	2.3	108.9	4.4	
Muhammadans	45.9	0.77	24.2	13.5	8.2	0.1
Others	3,029.7	50.72	1,083.4	821.4	949.67	175.2

Note.—Cape of Good Hope: Dutch Churches claim 18.71 %, Methodists 11.8 %, and Anglican Communion 11.02 % of the pop. Natal: Hindus 9.12 %, Anglican 5.5 %, Methodists 6.5 % of pop. Transvaal: Dutch Churches 13.56 %, Anglican 8.37 %, Methodists 7.08 %, Lutherans 6.4 %. Orange Free State: Dutch Churches 33.19 %, Anglican 8.03 %, Methodists 18.3 %.

For figures relating to the religions and occupations of the European population only, see p. 162.

	OCCUPATIONS. <i>In thousands</i>				<i>Orange P. S.</i>	<i>Prin. sub-div., Un. of S. Afr.</i>
	<i>Un. of S. Afr.</i>	<i>Cape.</i>	<i>Natal.</i>	<i>Transv.</i>		
<i>Professional :</i>						
(a) Official	32 679 0 54'0	10 1 0 4'0	5 2 0 45'0	12 0 72'0	5 3 1 01'0	(a) Engaged in Union and Prov. Gov., 16,886.
(b) Liberal arts.	41 096 0 7'0	20 4 0 79'0	6 0 5'0	11 1 0 64'0	3 6 0 69'0	(b) Education, 17,918.
<i>Domestic :</i>						
(a) Engaged in domestic offices and household duties	451 856 7 57'0	254 9 9 94'0	42 6 3 5'0	101 8 6 04'0	52 4 9 92'0	(a) Wives, widows, daughters and other relatives, 451,856.
(b) Engaged in the supply of board and lodging, &c.	285 101 4 77'0	120 9 4 71'0	37 3 1'0	77 1 4 58'0	50 9 48'0	(b) Engaged in attendance, 280,116.
<i>Commercial :</i>						
(a) Mercantile persons	68 947 1 15'0	28 2 1 10'0	10 6 0 89'0	25 2 1 5'0	4 8 0 92'0	Transport by tramways and roads, 22,336.
(b) Transport	55 145 0 92'0	27 2 1 06'0	9 8 0 82'0	15 4 0 91'0	2 7 0 52'0	
<i>Agricultural</i>	2,186 257 36 6'0	975 7 38 04'0	550 46 07'0	498 9 29 59'0	161 5 30 57'0	
<i>Industrial :</i>						
(a) Mechanics and metal workers	19 634 0 32'0	9 3 0 35'0	2 7 0 23'0	6 7 0 4'0	0 7 0 15'0	Working on or dealing in carriages, saddlery, 6,172.
(b) Construction and repair of buildings, railways, docks, &c.	79 247 1 34'0	31 2 1 22'0	11 3 0 94'0	30 5 1 81'0	6 2 1 16'0	Construction or repair of roads, harbours, 48,235.
(c) Textile and dress trades	23 395 0 39'0	13 2 0 51'0	2 1 0 18'0	0 7 0 46'0	1 3 0 25'0	Dress, 17,716.
(d) Food and drink, &c.	24 968 0 41'0	12 7 0 49'0	3 5 0 3'0	7 7 0 46'0	1 0 20'0	Vegetable food, 11,376.
(e) Working or dealing in animal and vegetable substances	6 528 0 11'0	4 6 0 18'0	0 7 0 05'0	1 2 0 07'0	0 05 0 01'0	Vegetable substances, 4,301.
(f) Minerals	342 458 5 73'0	39 3 1 55'0	12 5 1 05'0	275 2 16 31'0	15 4 2 90'0	Mining, 317,451.
(g) Undefined	80 498 1 35'0	32 8 1 28'0	16 8 1 41'0	22 7 1 35'0	8 2 1 55'0	
<i>Persons of independent means</i>	19 039 0 32'0	7 4 0 29'0	3 0 20'0	4 2 0 25'0	4 4 0 83'0	
<i>Dependents</i>						
upon natural guardians	2,222 139 37 2'0	96 3 37 55'0	475 2 39 8'0	578 34 28'0	205 9 38 99'0	Students, scholars, and children.
upon the community	21 440 0 36'0	9 7 0 38'0	2 4 0 2'0	8 1 0 48'0	1 2 0 23'0	Criminal class, 13,595.
Unspecified	12 967 0 22'0	4 0 16'0	2 2 0 18'0	3 5 0 21'0	3 3 0 62'0	

BIRTHPLACES. Census 1911

	<i>Un. of S. Afr.</i>	<i>Cape.</i>	<i>Natal.</i>	<i>Transv.</i>	<i>Orange F. S.</i>	<i>Un. S. Afr., born in Brit. Poss.</i>
Africa (1,000) . . .	5,629.1	2,479.7	1,083.2	1,555.4	510.8	5,507.6
% . . .	94.24	96.67	90.71	92.23	96.74	92.21
Europe (1,000) . . .	237.9	74.98	34.0	112.78	16.04	182.7
% . . .	3.98	2.93	2.84	6.7	3.04	3.05
Asia (1,000) . . .	90.3	6.6	74.0	9.24	0.34	89.1
% . . .	1.51	0.26	6.21	0.55	0.06	1.46
America (1,000) . . .	4.6	1.6	0.6	2.08	0.24	1.4
% . . .	0.08	0.06	0.06	0.12	0.04	0.03
Australasia, &c. (1,000) . . .	10.2	1.78	1.75	6.3	0.35	10.15
% . . .	0.17	0.07	0.15	0.38	0.06	0.17

REVENUE AND EXPENDITURE

REVENUE

<i>Av. of years.</i>	<i>Natal.¹ £1,000.</i>	<i>Cape.¹ £1,000.</i>	<i>Orange F. S. £1,000.</i>	<i>Transv. £1,000.</i>
1897-1901	2,034	6,808	—	—
1902-6	3,799	9,475	729	4,670 ²
1907-10 ³	3,809	7,611	870 ⁴	5,457 ²

¹ Includes receipts from loans.² Includes receipts from appropriations-in-aid, 1905-6-7-8, and in 1907 £492,000 collected in previous years but not brought into account.³ This period was one of three years eleven months, but allowance is made for the odd month in the results given above.⁴ Includes receipts from railways from 1909.

UNION OF SOUTH AFRICA

Period June 1, 1910—March 31, 1912

<i>Prin. sources of revenue.</i>	<i>Av. receipts per ann. £1,000.</i>	<i>% of total.</i>	<i>Actual receipts in 12 months, 1911-12, £1,000.</i>
Customs	4,525	26.07	4,508.6
Interest	3,261	18.79	3,361
Mining revenue	2,170	12.50	2,306.6
Post, telegraphs, &c.	1,475	8.5	1,471.8
Contrib. from railway and harbour fund	1,461	8.42	1,159
Native taxes	590	3.4	781.8
Transfers of property and succession	601	3.46	626.9
Departmental receipts	609	3.51	594.9
Licences	538	3.10	551.7
Other receipts	2,124	12.25	2,006.7
Total	17,354	100	17,369

EXPENDITURE

<i>Av. of years.</i>	<i>Natal. £1,000.</i>	<i>Cape. £1,000.</i>	<i>Orange F. S. £1,000.</i>	<i>Transv. £1,000.</i>
1897-1901	2,278	6,984	—	—
1902-6	3,943	9,612	684	4,319 ¹
1907-10 ²	3,688	8,077	875 ³	5,604 ¹

¹ Inclusive of expenditure from appropriations-in-aid in 1905-6-7.² Three years eleven months. In the figures given allowance has been made for the odd month.³ Includes £132,666 public debt charges in 1909.

UNION OF SOUTH AFRICA
Period June 1, 1910—March 31, 1912

<i>Prin. items of expenditure.</i>	<i>Av. expend. per ann. £1,000.</i>	<i>% of total.</i>	<i>Actual expend. 12 months, 1911-12. £1,000.</i>
Public debt	4,460	27·07	4,645·6
Provincial administrations	3,251	19·73	3,315
Post, telegraphs, telephones	1,447	8·78	1,485
Police	1,229	7·46	1,276·5
Agriculture dept.	675	4·10	625·4
Pensions	478	2·9	415·3
Public works dept	478	2·9	464·1
Prisons	468	2·84	460
Building, furniture, &c.	439	2·66	305
Magistrates	422	2·56	424
Defence	414	2·51	418·7
Other expenses	2,713	16·49	2,769·1
Total	16,474	100	16,603·7

Public Debt.—On May 30, 1910, the debt totalled £110,086,800, made up as follows: Natal, £20,595,900; Cape, £48,240,900; Orange Free State, £1,250,000; and Transvaal, £40,000,000. On Oct. 31, 1912, it stood at £106,028,200.

Banking (av. 1907-11).—*Natal*: Capital paid up, £4,259,000; liabilities, £4,131,000; assets, £5,915,000. *Cape of Good Hope*: Capital paid up, £4,393,000. Liabilities: notes in circulation, £1,067,000; bills in circulation, £22,000; deposits, £10,747,000. Assets: coin, £2,459,000; landed property, £560,000; notes and bills discounted, and other assets, £9,891,700.

Savings Bank.—The Union of South Africa Government Savings Bank for the nine months ending March 31, 1911, showed that the number of depositors was 225,238; amount deposited, £3,015,950; withdrawn, £2,328,500; standing to credit of depositors, £6,128,500.

AVERAGE OF FIVE YEARS 1906-10

<i>No. of Depositors.</i>	<i>Deposited. £1,000.</i>	<i>Withdrawn. £1,000.</i>	<i>Standing to credit of Depositors, including interest. £1,000.</i>
<i>Cape of Good Hope.</i>	<i>Post Office.</i>		
101,957	1,477	1,763	2,152
	<i>Private.</i>		
9,148	107·3	105·6	342
<i>Orange Free State.</i>	<i>Post Office.</i>		
6,771	145	143	163
<i>Transvaal.</i>	<i>Post Office.</i>		
57,195	1,435	1,290	1,497
<i>Natal.</i>	<i>Government.</i>		
22,761	345	335	516

OTHER AFRICAN AND INSULAR POSSESSIONS

AREA AND POPULATION

	Area. 1,000 sq. m.	% of area of U. K.	Population. 1901. 1,000.	1911. 1,000.	Inc. or dec % in last intercensal period.	Pop. per sq. m.	Males per 1,000 females.
Swaziland . . .	6.5	5.38	85.5 ¹	99.96	+ 16.9	15.3	812
Basutoland . .	11.7	9.65	348.8 ²	404.5	+ 16.5	34.6	835
Bechuanaland . .	27.5	22.66	120.7 ²	125.3	+ 3.8	0.4	1,001
S. Rhodesia . .	148.57	360	503	771	+ 53.3	3.6	1,113
N. Rhodesia . .	291		746.8	822.5	+ 10.2		—
Nyasaland . . .	39.8	32.78	706	970.4	+ 37.5	24.4	784
Uganda	223.5	184.1	3,500 (est.) ³	2,843.3	— 18.8	12.7	826
E. Africa Protect.	246.8	203.2	4,000 (est.) ³	2,402.8 ⁴	—	9.7	—
Somaliland . .	0.8	56	153 (est.)	346.8 (est.)	+ 125	5.1	—
St. Helena . . .	0.047	—	3.3	3.47	+ 4	74	867
Ascension Island	0.034	—	0.4	0.4 (est.)	—	11.8	—
N. Nigeria . . .	255.7	210.6	9,161.7 ¹	9,269	+ 1.2	36.2	886
S. Nigeria . . .	79.88	65.8	4,444.4	7,855	+ 76.8	98.4	852
Gold Coast . . .	80.23	66.1	1,486.4	1,501.8	+ 1.1	18.7	1,013
Sierra Leone ¹ .	24.9	20.5	1,024.2	1,403.1	+ 37	56.2	—
Gambia	3.6	2.98	90.35	146.1	+ 61.7	40.4	1,021
Zanzibar Island	0.63	0.52	—	114	—	178	—
Pemba Island . .	0.38	0.31	—	83.1	—	218	—
Mauritius . . .	0.72	0.59	37.1	368.8	— 0.6	512	1,111
(Dependencies) .	0.089	—	4.8	6.69	+ 39.3	75	1,180
Seychelles . . .	0.156	—	19.2	22.69	+ 17	145	1,039

¹ Colony and protect.² 1904.³ 1903.⁴ Administered prov. only.

AGRICULTURE

NYASALAND PROTECTORATE. *Coffee*.—Av. area under coffee (1907-11), 5,175 ac. (1911, 3,735). Av. product 800,000 lb. (1911, 786,304).

Chillies.—Av. area planted (1907-11), 543 ac. Av. product, 60 tons.

Tea.—Av. area under tea plants (1907-11), 1,083 ac. (1911, 2,593). Av. product, 1907-11, 35,000 lb. (1911, 44,000; 1912, 174,720).

Cotton.—Av. area under cotton (1907-11), 19,992 ac. (1911, 33,000). Av. domestic exp. 1,023,000 lb. (1911, 1,360,000 lb.), valued at £34,300 (1911, £44,000); 1912, 3.2 mill. lb., value £81,000.

Rubber.—Av. domes. exp. 1908-12, 42,200 lb. (1912, 61,000 lb.). Value £7,400 (1912, £11,000).

Tobacco.—Av. area under (1907-11), 3,800 ac. (1911, 7,400). Av. product. 1909-11, 1,645,000 lb. (1911, 1,949,000).

UGANDA. *Coffee*.—Area under, 697 ac. in 1910, 3,000 ac. in 1911. Av. product. 1910-11, 191,500 lb.; av. domestic exp. 1905-9, 23,000 lb. (1912, 7,430 ac., domes. exp. 373,600 lb.).

Cotton.—Area under, 740 ac. in 1904, 41,449 in 1910, and 60,920 ac. in 1911 (the only figures avail.). Product, 13 mill. lb. in 1910 and 22 mill. lb. in 1911. Av. domestic exp. 1907-11, 6,076 mill. lb., valued at £109,700 (1912, £254,000).

Rubber.—Av. ann. product. 1907-11, 67,000 lb., valued at £8,800.

E. AFRICA PROTECT. *Coffee*.—Area under, in 1911, 1,000 ac. Av. ann. domes. exp. 1908-11, 115,500 lb. (1912, 2,000 ac., 283,000 lb.).

Cotton.—Area under in 1911, 2,000 ac. Av. domes. exp. 1907-11, 110,600 lb., valued at £5,200 (1912, 295,000 lb., £11,800).

Rubber.—Domestic exp. (av. 1907-11), 141,000 lb. per ann., value £18,400.

Wool.—Av. dom. exp. 1909-12, 157,500 lb.; 1912, 202,000 lb.

In 1905-6 (later particulars cannot be stated) the acreage under maize

was estimated at 781,000; beans, 394,500 ac.; coco-nuts, 550,000 ac.; ellensine and millet, 1,980,000 ac.; ground-nuts, sesame, tobacco, and bananas, 2,865,600 ac.; potatoes, 500 ac.

NORTHERN NIGERIA. *Cotton*.—No estimate of the enormous acreage under cotton, or the production thereof, can be given, but the domestic exp. during the period 1904-11 (omitting 1908-9, for which statistics are not available) averaged 205,500 lb. per ann. (1911, 92,338 lb.; 1912, 1,028,000).

Rubber.—The av. quantity exp. during the period 1906-10, inclus., amounted to 790,000 lb. (1910, 520,000).

SOUTHERN NIGERIA. *Cocoa*.—Av. quantity of domestic exp. 1907-11. 5,319,000 lb. (1911, 9,859,000), value £87,000 (1911, £164,700).

Coffee.—Av. domestic exp. (1907-11), 41,000 lb.

Cotton.—Av. exp. of raw cotton (1907-11), inclus. of cotton produced in N. Nigeria (q.v.) and shipped from the ports of S. Nigeria, 3,266,000 lb., value £79,600 (1911, 2,238,000 lb., value £66,900).

Rubber.—Av. exp., inclusive of that produced in the Hinterland of the colony, 1907-11, 2,050,000 lb. (1911, 2,164,000 lb.), value £189,000 (1911, £179,000).

Forestry.—The av. no. and value of the logs ann. exp. during the period 1906-10 was 17,000 and £61,000.

GOLD COAST. *Cotton*.—Av. domestic exp. 1907-11, 32,000 lb., valued at £685.

Cocoa.—Av. domestic exp. (1907-11), 46,892,000 lb. per ann. valued at £858,000 (1911, 89 mill. lb., value £1,613,000).

Coffee.—Domestic exp., which in 1899 amounted to 143,000 lb., averaged 315 lb. for the period 1907-11.

Rubber.—Av. domestic exp. (1907-11) 2,796,000 lb. per ann., valued at £268,600.

SIERRA LEONE. *Coffee*.—Av. domestic exp. (1907-11), 18,200 lb. (1911, 23,600 lb., value £502).

Rubber.—Av. domestic exp. (1907-11), 80,000 lb. (1911, 41,000), valued at £10,600.

GAMBIA. *Rubber*.—Av. domestic exp. 1907-11, 23,000 lb. (1911, 10,700), valued at £2,000.

MAURITIUS. Av. area under crop (1908-11), as far as can be ascertained, 152,400 ac. (1911, 192,600).

Aloes, 7,000 ac.; *embrevades*, *beans*, *peas*, and *lentils*, 4,300 ac.; *manioc*, 2,140 ac.; *rubber*, 141 ac.; *cocoa* (av. 1907-11), acreage 58, domestic exp. 1,000 lb.; *coffee* (av. 1907-11), acreage 17, domestic exp. 1,029 lb. (1911, 2,645 lb.); *tea* (av. 1909-11), acreage 260, domestic exp. 84,000 lb. (1911, 88,200 lb.); *sugar* (av. 1907-11), acreage 125,750, product. 3,791,000 cwt. (1911, 3,336,500 cwt.); *tobacco* (av. 1907-10), acreage 18, product. 27,000 lb. (1911, 27,225 lb.).

SEYCHELLES ISLANDS. Av. exp. of cocoa (1907-11), 10,000 lb. Av. exp. of coffee (1907-11), 3,600 lb.

PRINCIPAL ARTICLES IMPORTED AND EXPORTED (IN £1,000)

NYASALAND (av. 1907-11).—*Imp.*: Piece goods, calico, cloth, &c. 101 (50.5% of total imp.), 1911, 145. Provisions (inclu. wine and beer), 21 (10.5%), 1911, 29. Hardware (inclu. paint and oils) 15 (7.5%), 1911, 25.6. *Exp.*: Raw cotton 35 (22.29%), 1911, 48.2. Tobacco 29 (18.47%), 1911, 54. Specie 27 (17.2%), 1911, 47. Coffee 15 (9.55%), 1911, 16.4. Rubber 8.6 (5.47%), 1911, 20.3.

UGANDA (av. 1907-11).—*Imp.*: Textiles, piece goods, &c. 144 (30.32%), 1911, 207.2. Bullion and specie 72 (15.16%), 1911, 96.4. Ivory 34

(7.16%), 1911, 20. Provisions 21 (4.42%), 1911, 27.2. *Exp.*: Raw cotton 110 (35.72%), 1911, 231. Ivory 61 (19.8%), 1911, 50. Hides and skins 44 (14.29%), 1911, 50. Rubber 15 (4.87%), 1911, 6. Chillies 9.2 (3.08%), 1911, 16.6.

E. AFRICA PROTECT. (av. 1907-11).—*Imp.*: Cotton goods 245 (26.07%), 1911, 350. Grain and flour 89 (9.47%), 1911, 101. Provisions 71 (7.55%), 1911, 77. *Exp.* Hides and skins 182 (26.18 %), 1911, 244. E. A. Prod. 46 (6.62%), 1911, 74.6. The remainder from Uganda, &c. Cotton, raw, 125 (17.99%), 1911, 253. E. A. Prod. 5 (0.72%), 1911, 6. Ivory 88 (12.66%), 1911, 77. E. A. Prod. 20 (2.88%), 1911, 15.6. Grain 68 (9.78%), 1911, 147. Rubber 54 (7.76%), 1911, 41. E. A. Prod. 18 (2.58%), 1911, 16.

SOMALILAND (av. 1907-11).—*Imp.*: Rice 81.6 (29.61%), H. Y. 1909, 84. Textiles 70.6 (25.63%), 1909, 80.6. Dates 23.2 (8.42%), 1909, 27.3. Specie 19.6 (7.11%), 1909, 33.1. Grain, jowaree, 16.2 (5.88%), 1909, 12. *Exp.* Skins 139 (60.4%), 1910, 144. Sheep and goats 27 (11.7%), 1910, 24.9. Specie 13.6 (5.9%), 1910, 16.1. Ghi 12.6 (5.4%), 1910, 17. Gums and resins, 7.2 (3.1%), 1910, 7.5.

N. NIGERIA. *Principal imp. and exp. via Idah (Niger River).*—*Imp.* (av. 1908-9-1910-11): Railway mat. 280 (24.85%). Stores and building mat. imported by Gov. (av. 1909-10-1910-11) 290 (22.3%). Specie imp. by Gov. 225 (19.97%). Cotton goods 85 (7.54%). Kola-nuts 21 (1.864%). Salt 14 (1.24%). Provisions 13 (1.15%). *Exp.*: Shea-nuts 67 (18.72%). Tin oxide 56 (15.64%). Palm kernels 52 (14.52%). Rubber 37 (10.34%). Ground-nuts 12.7 (3.55%). Gums 8.5 (2.37%).

S. NIGERIA (av. 1907-11).—*Imp.*: Cotton manuf. 1,148 (22.76%), 1910, 1,323. Specie 490 (9.71%), 1910, 735. Iron, steel, hardware, and cutlery 325 (6.44%), 1910, 440. Spirits: gin and Geneva 321 (6.36%), 1910, 396. Railway and bridge mat. 225 (4.46%), 1910, 163. Tobacco 187 (3.7%), 1910, 215.6. Cooper's stores, 154 (3.05%), 1910, 195. Cement and building mat. 140 (2.77%), 1910, 21.8. Provisions 118 (2.34%), 1910, 123. *Exp.*: Palm kernels 1,985 (44.17%), 1911, 2,574. Palm oil 1,471 (32.73%), 1911, 1,697. Rubber 189 (4.2%), 1911, 179. Specie 110 (2.44%), 1911, 37. Cotton, all sorts, 97 (2.16%), 1911, 79.1. Cocoa 87 (1.93%), 1911, 164.6. Tin, ore and block, 81 (1.8%), 1911, 181.8. Mahogany 61 (1.35%), 1911, 55.5. Shea prod. 49 (1.09%), 1911, 40.5.

GOLD COAST (av. 1907-11).—*Imp.*: Cotton manuf. 555 (19.8%), 1911, 678. Specie 505 (18.01%), 1911, 881. Machinery 185 (6.6%), 1911, 218. Provisions 125 (4.46%), 1911, 164. *Exp.*: Bullion: gold, dust and concentrates 1,037 (36.21%), 1911, 1,072. Cocoa 858 (29.96%), 1911, 1,613. Rubber 268.6 (9.38%), 1911, 219. Specie 184 (6.42%), 1911, 321. Lumber, 139 (4.85%), 1911, 139. Palm oil 132 (4.61%), 1911, 129. Palm kernels 130.6 (4.56%), 1911, 176. Kola-nuts 85.6 (2.99%), 1911, 93.

SIERRA LEONE (av. 1907-11).—*Imp.*: Cotton manuf. 271 (26.07%), 1911, 306. Specie 162 (15.45%), 1911, 218. Tobacco 58 (5.56%), 1911, 60. *Exp.* Palm kernels 513 (50.29%), 1911, 657. Kola-nuts 153 (15%), 1911, 194. Specie: silver 141 (13.82%), 1911, 161.7. Coal and coke 58.6 (5.74%), 1911, 82.6. Palm oil 57 (5.59%), 1911, 70. Ginger 23 (2.25%), 1911, 44.7.

GAMBIA (av. 1907-10).—*Imp.*: Specie 162.4 (35.4%), 1910, 208.5. Cotton manuf. 90.1 (19.8%), 1910, 130.6. Kola-nuts 47.6 (10.4%), 1910, 65.5. Rice 47 (10.3%), 1910, 46. *Exp.*: Ground-nuts 304 (86%), 1910, 388. Hides 9 (2.5%), 1910, 11.3. Palm kernels 4 (1.1%), 1910, 5.6.

ZANZIBAR (av. 1907-11).—*Imp.*: Piece goods 215.4 (20%), H. Y. 1907, 272.5. Grain 181.4 (16.9%), 1907, 197.7. Bullion and specie 111 (10.3%), 1907, 151.5. Ivory 61 (5.7%), 1907, 49.5. *Exp.* Cloves 336 (31.8%), 1911, 437. Copra and chikichi 158.4 (15%), 1911, 204. Piece goods 142.2 (13.4%), 1911, 112.9. Bullion and specie 72.8 (6.8%), 1911, 70. Ivory 68.8 (6.5%), 1911, 82.7.

MAURITIUS (av. 1907-11).—*Imp.*: Rice 531 (23·83 %), 1911, 614. Coal 141 (6·33 %), 1911, 158·5. Bullion and specie 120 (5·39 %), 1911, 21·6. Hardware and cutlery 88 (3·95 %), 1911, 204. Grain, other than rice 85 (3·81 %), 1911, 118·6. *Exp.*: Sugar, raw 2,299 (91·22 %), H. Y. 1907, 2,592. Bullion and specie 72 (2·85 %), 1907, 170. Aloe fibre 44 (1·75 %), 1907, 63 2. Molasses 26 (1·03 %), 1907, 24.

SEYCHELLES (av. 1908-10).—*Imp.*: Rice 16·6 (20·5 %), 1910, 16·1. Cotton manuf. 11 4 (14 %), 1910, 13·7. Bullion and specie 3 6 (4·4 %), 1910, 8·8. *Exp.*: Copra, 39·8 (25·4 %), 1910, 57·5. Manure 34·4 (20·8 %), 1910, 47·9. Vanilla 20 (17·1 %), 1910, 30.

ST. HELENA (av. 1907-10).—*Imp.*: Oilmen's stores 6·1 (17·63 %), 1910, 5 7. Drapery 3·9 (11·2 %), 1910, 3·9. Coal 3·3 (9·53 %), 1910, 4·4. Flour 2·9 (8·38 %), 1910, 3·6. Rice 2·1 (6·06 %), 1910, 2·1. *Exp.*: Specie 3·25 (45·8 %), 1910, 5·3. Fibre 2·0 (28 %), 1910, 1·4.

SWAZILAND, BASUTOLAND, BECHUANALAND, and RHODESIA. Since 1910 all particulars concerning imp. and exp. have been included in the return for Brit. S. Africa.

MINERALS

GOLD COAST. GOLD. Output. Domestic exports ^a

<i>Per. of years.</i>	1,000 oz.	H. Y.	1,000 oz.	£1,000.	<i>Value.</i> H. Y.	£1,000.
1897-1901	14·6 *	1897	23·5	52	1897	84·8
1902-6	113·6 *	1906	217·3	423	1906	822
1907-11	244·6	1908	281·3	1,039	1908	1,194·7

SOUTHERN RHODESIA. GOLD

1898-1901	82·5	1901	172	296	1901	610
1902-6	330	1906	552	1,184	1906	1,985
1907-11	616	1911	628·5	2,509	1911	2,648

SOUTHERN RHODESIA. SILVER. Value estimated

1899-1901	1·4	1901	3·1	0·1	1901	0·3
1902-6	58·8	1906	110·6	6·8	1906	14·3
1907-11	219·6	1908	283·4	23·6	1908	29·4

SOUTHERN RHODESIA. COAL. Value of coal sold

	(tons)		(tons)			
1903-6	69	1906	92·7	—	1906	56
1907-II	151	1911	189·8	75	1911	92

Copper.—Av. product. in S. Rhodesia (1906-10); ingots, &c., 65 tons (1909, 87 tons), av. value £4,600 (1907, £6,760).

Chrome, iron ore (S. Rhodesia).—Av. product. (1906-11) 22,000 tons (1911, 46,750 tons). Value £55,000 (1911, £117,000).

Lead (Rhodesia).—Av. product. (1908-11) 760 tons (1908, 954 tons). Value £10,000 (1908, £13,035).

Diamonds (S. Rhodesia).—Av. value of diamonds produced, 1905-S. £8,750 (1907, £20,000).

Bechuanaland: *Gold*.—Av. product. (1907-11) 7,340 oz (H. Y. 1909, 17,000 oz.) Av. value £27,000 (H. Y. 1909, £55,600).

Swaziland: *Gold product*.—Av. quantity produced (1907-11) 9,900 oz. (1911, 14,780). Value, £41,800 (1911, £62,800).

Tin product.—Av. quantity of ore produced (1907-11) 410 tons (1911, 280). Value £39,000 (1911, 32,400).

N. Nigeria: *Tin*.—Average production of metal (1907-10) 27 tons, valued at £3,445 (1910, 31 tons, value £4,650). Av. product. of ore (1907-11) 628 tons, valued at £79,000 (1911, 1,530 tons, value £181,760).

Nyasaland.—The av. amount of mica produced is 22½ tons, and the domestic exports are valued at £2,600 (1911, 66 tons, value £6,857 exported).

IMPORTS AND EXPORTS

IMPORTS						EXPORTS				
Av. of years.	Total Imp. £1,000.	H. Y.	£1,000.	£1,000.	Av. Imp. from U.K.	Total Exp. £1,000.	H. Y.	£1,000.	£1,000.	Av. Exp. to U.K.
					% of total.					% of total.
					<i>Nyasaland Protect.</i>					
1897-1901	138	1899	183	131 ¹	94.93	41	1899	79	40 ¹	97.5
1902-6	227 ²	1906	283	176 ²	77.54	62 ²	1905	87	36 ²	58.0
1907-11	199 ²	1911	291	143 ²	71.85	157 ²	1911	231	113 ²	71.97

¹ Estimated from 1897-1901 inclusive.² Including transit trade from 1904-5 onward.*Basutoland (included in B. S. A. from 1910)*

1897-9	93.2 ¹	1897	100	Not available	115	1898	138.5	Not available
1901-3	189.1 ¹	1903	230.7		263	1901	361.6	
1904-6	230	1904	298		162	1906	194	
1907-9	247	1909	260		277	1909	353	

¹ Dutiable goods only.*S. Rhodesia (exclu. transit trade from 1906)*

1900-1	1,322	1901	1,443	—	—			
1902-6	1,388	1902	1,858	—	—			
1907-11	2,210	1911	2,975	1,160	52.4	2,893	1909	3,159 2,570 88.86

NW. Rhodesia (exclu. transit trade from 1906)

1907-11	188.6	1909	377	99.2	52.98	109	1911	128.5 Not available
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Uganda Protectorate (imp. inclu. but exp. exclude transit trade)

1902-6	170	1906	296	69	40.6	75	1906	116 — —
1907-11	475	1911	624	176	37.05	262.2	1911	392 91.6 34.94

East Africa Protectorate

1897-1901	415	1898	472 (est.)	130	31.3	86	1899	122 — —
1902-6	564	1906	753	188	33.33	244	1906	419 42 17.2
1907-11	940	1911	1,330	362	38.51	695	1911	1,017 232 33.38

Somaliland Protectorate (exclu. trade of Hais and Karam in years prior to 1902-3)

1897-1901	385	1899	452.5	—	—	316	1898	415 — —
1902-6	326	1903	431.3	—	—	370	1903	352 — —
1907-11	275.6	1909	317.1	1.9	0.69	230	1910	247.3 0.6 0.26

St. Helena (exclu. Gov. stores)

1897-1901	64	1901	105.6	57.6	90	4.6	1897	5.0 4.14 90
1902-6	66	1902	100	61.2	92.7	6.3	1903	12.2 1.16 18.4
1907-11	36	1911	42	33.2	92.2	7.7	1911	9.9 6.66 86.5

N. Nigeria (approx. only and represent for the most part imp. via River Niger)

1901-4	272	1904	358	—	—	109	1904	153
1907-11	967	1910	1,374	546 ¹	51.1	429	1911	836 314 ² 60.5

¹ Average of years 1908-11, during which period the average total imports amounted to £1,067,000 per annum.² Average of years 1908-9-11, during which period the average total exports amounted to £519,000 per annum.

IMPORTS AND EXPORTS

Av. of years.	IMPORTS					EXPORTS				
	Total Imp.	H. Y.	£1,000.	£1,000.	Av. Imp. from U.K. % of total.	Total Exp.	H. Y.	£1,000.	£1,000.	Av. Exp. to U. K. % of total.

Southern Nigeria

1897-1901	1,745	1901	2,034	1,404	80.4	1,841	1901	2,162	946	51.3
1902-6	2,674	1906	3,148	2,019	75.5	2,820	1906	3,151	1,390	49.5
1907-11	5,045	1910	5,857	3,694	73.23	4,495	1911	5,391	2,198	48.92

¹ The value of the transit trade to and from Northern Nigeria is included, but foreign transit trade, i.e. goods to or from Dahomey, Cameroons, or French territory beyond the Niger, the average value of which (1907-11) amounted to (1) imp., £115,000, (2) exp., £307,000, is included in the imports but excluded from the exports from 1906.

Gold Coast

1897-1901	1,280	1901	1,795	927	72.43	881	1899	1,111	565	64.12
1902-6	1,950	1902	2,120	1,412	72.41	1,347	1906	1,996	900	66.8
1907-11	2,803	1911	3,784	2,072	73.91	2,863	1911	3,792	1,999	69.82

Sierra Leone

1897-1901	57.2	1899	690	454	79.38	339	1897	400.7	131	38.65
1902-6	723	1906	886	529	73.18	517	1906	716.6	171	33.08
1907-11	1,042	1911	1,267.3	762	73.14	1,019	1911	1,300	230	22.58

Gambia

1897-1901	239	1900	277.7	116	48.54	234	1900	282	35.2	15.04
1902-6	341	1906	447.7	140	41.05	320	1906	428	18.6	5.8
1907-11	525	1911	807.1	203	38.67	475	1911	682	44.0	9.26

Port of Zanzibar (includ. to 1900, trade with other portions of the Sultan's dominions)

1897-1901	1,172.7	1899	1,596.6	128	10.91	1,307.5	1899	1,513.4	117	8.93
1902-6	1,075.5	1904	1,239.7	148	13.68	1,088.2	1904	1,211.1	111	10.43
1907-11	1,074.0	1907	1,233	149	13.85	1,057.1	1911	1,193.1	100.4	9.49

Pemba.—The av. value of imports, 1908-10, was £124,900, and exports, £170,800.

Mauritius

1897-1901	1,959	1901	2,107	484	24.71	1,895	1900	2,128	126	6.65
1902-6	2,174	1907	2,637	598	27.51	2,522	1904	2,822	276	10.94
1907-11	2,228.6	1911	2,543	608	27.29	2,520 ¹	1907	2,938	481 ¹	19.08

¹ Inclusive of shipping charges on the produce and manufacture of Mauritius from 1910 inclusive, previously excluded.

Seychelles

1897-1901	71	1901	80.7	22.4	31.54	97	1899	126.5	39.6	40.83
1902-6	61	1903	68.3	17	27.87	63	1902	82.5	16.2	25.71
1907-11	85	1910	98.5	27	31.77	129	1907	150.8	25.2	19.54

Swaziland.—The returns since 1910 have been included in those for British S. Africa as a whole and have not been compiled separately.

The av. imp., 1906-9, amounted to £43,250 (1909, £50,200). The av. exp. during the two and a half years, July 1907 to December 1909, amounted to £79,000 per ann. (1909, £91,000). Imp. from U. K., 1909-11, av. £1,300; exp. to U. K. av. £1,500 (1911, £123,600).

Bechuanaland (included in British S. Africa since 1910).—Av. imp. 1906-9, £102,250 (H. Y. 1906, £118,000); av. exp., 1906-9, £79,000 (H. Y. 1909, £123,600). Imp. from U. K., 1909-11, av. £12,100.

TRADE WITH PRINCIPAL COUNTRIES.* *Average of five years, 1907-11*

NYASALAND. H. Y. Imp. and Exp. 1911

<i>Imports.</i>	£1,000.	% of <i>total.</i>	H. Y. £1,000	<i>Exports.</i>	£1,000.	% of <i>total.</i>	H. Y. £1,000.
U. K.	143	71·85	210·7	U. K.	113	71·97	195·5
Total Brit. E.	160	80·45	234·5	Total Brit. E.	130·1	82·87	205·8
Germany . . .	17	8·5	19	Germany . . .	11·7	7·45	17·1
Total For. co.	39	19·55	56·9	Total For. co.	26·9	17·13	25·9
Total imports	199	100	291·4	Total exports .	157	100	231·6

UGANDA. H. Y. Imp. (countries of origin) and Exp. (countries of ultimate destination) 1911

U. K.	176	37·05	229	U. K.	91·6	34·94	180
E. Afr. Prot. .	75	15·79	118	E. Afr. Prot.	161	61·41	207
Total Brit. E.	284	59·79	399	Total Brit. E.	252·8	96·42	387·7
United States.	53	11·16	77				
Total For. co.	191	40·30	226	Total For. co.	9·4	3·58	4·8
Total imports ¹	475	100	625	Total exports ²	262·2	100	392·5

¹ Including goods in transit.² Excluding goods in transit.

E. AFRICA PROTECT. H. Y. Imp. (co. of origin) and Exp. 1911

U. K.	362	38·51	549	U. K.	232	33·38	410
British India .	203	21·49	241	Zanzibar Protect.	51	7·34	69
Total Brit. E.	592	62·98	822	Total Brit. E.	309	44·46	515
Germany . . .	88	9·36	129	Germany . . .	108	15·53	148
United States	73	7·76	133	United States	100	14·39	91
Holland . . .	58	6·17	85	France	94	13·52	146
Total For. co.	348	37·02	508	Total For. co.	386	55·54	502
Total av. imp. ¹	940	100	1,330	Total av. exp.	695	100	1,017

¹ Exclu. merchandise and specie as follows: Importations on behalf of the E. Africa Admin. (av. 1907-11, £67,000); Uganda Admin. (av., 1907-11, £35,000); for construction, &c., of Uganda Railway (av., 1907-11, £71,000); of bull. and specie (av., 1907-11, £124,000); and of goods in transit (av., 1907-11, £215,000); averaging in the aggregate £512,000 (£740,000 in 1911).

SOMALILAND. H. Y. Imp. 1909, Exp. 1910

<i>Imports.</i>	£1,000.	% of <i>total.</i>	H. Y. £1,000.	<i>Exports.</i>	£1,000.	% of <i>total.</i>	H. Y. £1,000.
U. K.	19	0·69	1·4	U. K.	0·6	0·26	3
Aden	223	80·93	252·8	Aden	218·6	95·06	227·4
Total Brit. E.	257·9	93·59	293·3	Total Brit. E.	222·4	96·70	234·1
Total For. co.	17·7	6·41	23·7	Total For. co.	7·6	3·30	13·2
Total imp.	275·6	100	317·0	Total exp.	230	100	247·3

S. NIGERIA.¹ H. Y. Imp. 1910, Exp. 1911

U. K.	3,694	73·23	4,194	U. K.	2,198	48·92	2,583·6
Gold Coast . .	186	3·69	154	Gold Coast . .	49·6	1·1	36
Total Brit. E.	3,932	77·95	4,409·9	Total Brit. E.	2,269	50·50	2,626·4
Germany . . .	560	11·1	648	Germany . . .	1,987	44·22	2,613
Holland . . .	397	7·87	508	Holland . . .	107	2·38	97
Total For. co.	1,113	22·05	1,447·4	Total For. co.	2,226	49·50	2,765
Total av. imp.	5,045	100	5,857·3	Total av. exp.	4,495	100	5,391·4

¹ The value of the transit trade to and from N. Nigeria is inclu. but not foreign transit trade, i.e. goods to or from Dahomey, Cameroons, or French territory beyond the Niger, the av. val. of which (1907-11) amounted to (i) imports, £115,000; (ii) exports, £307,000. Similar statistics for N. Nigeria are not available.

² Unless otherwise stated *Imports* are credited to the countries from which they were received directly by the importing countries, and *Exports* to the countries to which they were consigned.

GOLD COAST. H. Y. Imp. and Exp. 1911

<i>Imports.</i>	£1,000.	% of <i>H. Y.</i> <i>total.</i>	£1,000.	<i>Exports.</i>	£1,000.	% of <i>H. Y.</i> <i>total.</i>	£1,000.
U. K. . .	2,072	73.91	2,843	U. K. . .	1,999	69.82	2,454
S. Nigeria . .	64	2.28	24	S. Nigeria . .	183.6	6.41	293.7
Total Brit. E. .	2,154.6	76.85	2,898.7	Total Brit. E. .	2,192	76.56	2,748.2
Germany . .	270	9.63	305	Germany . .	414	14.45	552
Holland . .	156.4	5.56	182	France . .	182	6.36	397
Total For. co. .	633.4	22.59	885.6	Total For. co. .	671	23.44	1,044.1
Total av. imp. ¹	2,803	100	3,784.3	Total av. exp. ¹	2,863	100	3,792.5

¹ Inclu. parcels post.

SIERRA LEONE. H. Y. Imp. (co. of consignment) and Exp. (co. of ult. dest.) 1911

U. K. . .	762	73.14	951	U. K. . .	230	22.58	313.6
Gambia . .	17	1.61	24.7	Gambia . .	83.4	8.18	89.6
Total Brit. E. .	795	76.38	987	Total Brit. E. .	378	37.11	493.6
Germany . .	115	11.04	142	Germany . .	438	43	535
Total For. co. .	247	23.72	280.3	Total For. co. .	610	59.86	719
Total imp. .	1,042	100	1,267.3	Total av. exp. ¹	1,019	100	1,300.1

¹ Inclu. unclassified exp.

GAMBIA. Av. 1907-10. H. Y. Imp. and Exp. 1910

U. K. . .	185.4	40.7	233.7	U. K. . .	38.8	8.64	38.6
Sierra Leone . .	63.6	13.9	66.6	Sierra Leone . .	—	—	—
Total Brit. E. .	254.3	55.89	300.4	Total Brit. E. .	71.5	15.92	89.5
France . .	141.1	31.01	196.1	France . .	326.8	72.78	404.7
Germany . .	24.7	5.42	30.2	Germany . .	—	—	—
Total For. co. .	200.7	44.11	278.5	Total For. co. .	377.5	84.08	445.9
Total imp. .	455	100	578.9	Total exp. .	449	100	535.4

PORT OF ZANZIBAR. H. Y. Imp. 1907, Exp. 1911

U. K. . .	148.72	13.85	193.2	U. K. . .	100.4	9.49	116
Brit. India . .	420.4	39.13	490.9	Brit. India . .	220.4	20.84	271
Total Brit. E. .	674.26	62.76	806.7	Total Brit. E. .	433.6	41	501.5
German E. Afr. .	131	12.20	128.1	German E. Afr. .	193.2	18.28	182
Holland . .	53.3	4.94	62.8	France . .	167	15.80	209
United States . .	46.6	4.43	48	Germany . .	102.2	9.66	112
Total For. co. .	399.74	37.24	426.2	Total For. co. .	623.5	59	691.5
Total imp. .	1,074	100	1,232.9	Total exp. .	1,057.1	100	1,193

MAURITIUS. H. Y. Imp. (co. of origin) 1911, Exp. (co. of ult. destination) 1907

U. K. . .	608	27.29	809.5	U. K. . .	481	19.08	444.6
India . .	965	43.3	1,048	India . .	1,489	59.1	1,840
Total Brit. E. .	1,755	78.75	2,046.7	Total Brit. E. .	2,399	95.18	2,808.9
France . .	185	8.30	230	France . .	56	2.23	18
Total For. co. .	472	21.17	496.5	Total For. co. .	121	4.82	128.8
Total imp. ¹	2,228.6	100	2,543.2	Total exp. .	2,520	100	2,937.7

¹ Inclu. parcels post unclassified.

SEYCHELLES. Av. 1907-10. H. Y. Imp. 1910 (co. of origin), Exp. 1907

U. K. . .	25.6	30.66	26.9	U. K. . .	24.6	19.02	43.2
India . .	27.5	32.94	32.3	India . .	—	—	—
Total Brit. E. .	67	80.24	79.2	Total Brit. E. .	44	34.03	67.6
Germany . .	—	—	—	Germany . .	16.7	12.91	12
France . .	13.2	15.81	16	France . .	46	35.58	62.4
Total For. co. .	16.5	19.76	19.2	Total For. co. .	85.3	65.97	83.2
Total imp. .	83.5	100	98.4	Total exp. .	129.3	100	150.8

ST. HELENA. Av. 1907-10. H. Y. Imp. and Exp. 1910

U. K. . .	31.9	92.2	33.8	U. K. . .	6.2	87	8.16
Brit. Possess. .	2.7	7.8	3.7	Brit. Possess. .	0.9	13	1.07
Brit. Emp. and total imp. .	34.6	100	37.5	Brit. Emp. and total exp. .	7.1	100	9.23

STATISTICS

FINANCE

REVENUE.						EXPENDITURE.		
<i>Av. of years.</i>	<i>£1,000.</i>	<i>H.Y.</i>	<i>£1,000.</i>	<i>Average Customs Revenue £1,000.</i>	<i>% of total.</i>	<i>£1,000.</i>	<i>H.Y.</i>	<i>£1,000.</i>
SWAZILAND. Pub. Debt av. 1907-11, £81,000 (1912, £100,000)								
1905-6	43·3	1906	46	4·4	10·15	35·4	1906	46·3
1907-11	49·4	1910	58·7	12·5	9·47	65·4	1908	91·1
BASUTOLAND. Pub. Debt, nil								
1897-1901	57	1901	74·9	17·1	30	50	1900	59·5
1902-6	101·6	1904	106·8	28	27·57	77	1906	93·3
1907-11	120·6	1911	145·5	36	29·85	117	1908	126·6
BECHUANALAND. Pub. Debt, nil								
1897-1901	25·6	1897	33	8	31·25	80	1900	103·6
1902-6	30·4	1903	32	11	36·18	78·4	1903	83
1907-11	47	1911	59	11·4	24·25	69·6	1907	75·85
SOUTHERN RHODESIA (exclu. of Head Off. Rev. and Expend. of the B. S. Africa Co.)								
1897-1901	341	1901	439	— ¹	—	734	1898	826
1902-6	493	1906	545	129·4	26·25	665·6	1902	841·7
1907-10	632	1910	785	209·5	33·15	551	1910	648·7
¹ First imposed in Southern Rhodesia on August 1, 1899.								
NORTH-EASTERN RHODESIA (amalgamated with N. W. Rhodesia 1911)								
1897-1901	4·1	1901	11·5	—	—	34	1900	57·6
1902-6	22·2	1904	28	1·8 ¹	8·1	67·4	1904	90·5
1907-10	23·7	1909	25·5	1·6	6·71	47·5	1908	49·2
¹ Inclu. receipts from the exp. and sales of rubber and ivory.								
NORTH-WESTERN RHODESIA								
1897-1901	—	—	—	—	—	14·4	1901	30
1902-6	24·8	1906	62·4	6·54 ¹	21·27 ¹	61·4	1906	89
1907-10	68	1910	73	14·9	21·9	94	1910	103
¹ 1903-6.								
NYASALAND. Pub. Debt, 1912, £50,000								
1897-1901	43	1901	54	7·5	17·4	86	1901	107
1902-6	74	1906	82	16·8	22·7	111	1904	122
1907-11	85	1911	97	16·3	19·1	109	1911	118
UGANDA PROTECT. Pub. Debt, 1912, £295,000								
1897-1901	45·4	1900	81·8	9·2	20·26	274	1898	492
1902-6	65·7	1906	96·8	9·4	14·31	189	1902	204
1907-11	155	1911	203·5	27	17·42	270	1911	382
EAST AFRICA PROTECTORATE. Pub. Debt, 1912, £250,000								
1897-1901	64	1899	69·8	28	43·7	200	1901	278
1902-6	218 ¹	1906	461·4	56	25·6	413 ¹	1906	616
1907-11	560	1911	729	81	14·4	703	1911	772
¹ Only the <i>profit</i> on the Uganda Rly. (£69,000) was brought to account in 1905-6. In later years receipts and payments were included in the Finance Returns. Av. rly. receipts, 1907-11, £274,000. Av. expenditure, 1907-11, £189,000.								
SOMALILAND PROTECT. Pub. Debt, nil								
1897-1901	24	1901	28·9	20·6	85·8	30	1901	59
1902-6	35	1903	39·8	26·4	75·4	82	1905	127
1907-11	31	1911	32·6	25	80·6	121	1909	193

Av. of years.	REVENUE.			Average Customs Revenue % of		EXPENDITURE.		
	£1,000.	H.Y.	£1,000.	£1,000.	% of total.	£1,000.	H.Y.	£1,000.
ST. HELENA. Pub. Debt, nil								
1897-1901	13·9	1901	24·6	8·46 ²	60·8	12·62	1901	14·9
1902-6	14·16	1902	23	8·3 ²	58·62	15·96	1903	20·4
1907-11 ¹	7·26	1911	8·6	3·34	46·61	8·76	1910	9·6

¹ Excluding Imperial Grants from 1909-10.

² The population being more than doubled by the presence of a large number of prisoners of war and an augmented garrison during the early portion of the century accounts for the considerable difference in the average Customs Receipts during the period 1897-1901, 1902-6, and those obtaining in the last half decade.

N. NIGERIA. Pub. Debt, nil								
1900-1	42·65	1900	46·9	39·5	92·62	270	1901	298·5
1902-6	145·6	1906	217	66·4	45·6	481	1904	520·5
1907-11	340	1911	615	91	26·7	599	1911	828

SOUTHERN NIGERIA. Pub. Debt, av. 1907-11, 5·4 mill.; 1912, 8·27 mill.								
1897-1901	455 ¹	1901	637	420 ²	98·46	422 ³	1901	567
1902-6	883 ²	1906	1,064	754 ¹	85·30	860 ³	1906	1,055
1907-11	1,620	1911	1,956	1,212	74·8	1,506	1911	1,717
¹ Colony £209,000.			² Colony £347,000.			³ Colony £188,000.		
⁴ Colony £257,000.			⁵ Colony £206,000.			⁶ Colony £333,000.		

GOLD COAST. Pub. Debt, av. 1907-11, £2,416,000 (1911, £2,489,000)								
1897-1901	325	1901	471	267	82·15	416	1900	515
1902-6	588	1906	673	371	63·1	587	1904	622
1907-11	870	1911	1,111	527	60·57	728	1911	889·5

SIERRA LEONE. ¹ Pub. Debt, av. 1907-11, £1,269,000								
1897-1901	150·6	1901	192	99·6	66·16	141·4	1901	173
1902-6	254	1906	305	138	54·33	242	1905	295
1907-11	384·6	1911	458	204	53·04	363·6	1911	432

¹ Inclu. Rly. and Tramway Receipts and expenses, for which see Rlys.

GAMBIA. Pub. Debt, nil								
1897-1901	45·2	1900	49	34·4	76·12	33	1901	48·5
1902-6	55·6	1906	65	41·4	74·46	60·2	1905	72·3
1907-11	73·2	1911	86	59	80·61	61·8	1911	71·4

ZANZIBAR. Pub. Debt, 1911, £72,000								
1897-1901	117·8	1898	127·5	62·38	52·95	125	1899	133·3
1902-6	169·86	1906	191·5	94·34	55·51	145·6	1905	159·8
1907-11	207·52	1907	247·5	119·16	57·41	199·6	1908	219·7

MAURITIUS. Pub. Debt, av. 1907-11, £1,305,000								
1897-1901 ¹	564	1900 ²	612	208	36·88	560 ¹	1900 ²	571
1902-6	647	1905	693	225	34·77	663	1904	711
1907-11	664	1911	742	236	35·54	649	1907	678
¹ 4½ years.			² Highest complete year.					

SEYCHELLES. Pub. Debt, av. 1907-11, £15,600								
1897-1901	24·2	1901	30·5	14	57·85	20·2	1901	25·5
1902-6	27·2	1903	31·2	13	47·78	29	1903	34·4
1907-11	34·2	1911	36·4	17	49·71	31	1909	34·6

SHIPPING. Total net tonnage of vessels entered and cleared,
(exclu. of coasting trade)

Av. of five years. 1,000 tons. II. Y. 1,000 tons. *Av. tonnage of Brit. vessels.* 1,000 tons. % of total.

E. AFRICA PROTECTORATE (Gross Tonnage)

1897-1901	—	1901	718	396	55.1
1902-6	1,665	1906	1,909	557	33.4
1907-11	2,193	1911	2,886	754	34.3

SOMALILAND PROTECT. (Total tonnage entered and cleared at the Ports of Zeyla, Berbera, and Bulhar only, except for 1906-7 and later years, in which years statistics for Hais were also available.)

1897-1901	84	1899	97.5	56.4	67.1
1902-6	114	1903	140.4	83	72.8
1907-11	128	1909	161.3	103.6	80.9

ST. HELENA (Gross Tonnage)

1897-1901	283	1901	507	281	99.28
1902-6	397.6	1902	469	397	99.84
1907-11	333.6	1911	369	331	99.22

GOLD COAST

1897-1901	1,272	1901	1,417	833	65.48
1902-6	2,012	1905	2,159	1,221	60.68
1907-11	2,464	1911	2,676	1,559	63.27

SIERRA LEONE

1897-1901	1,183	1900	1,291	928	78.43
1902-6	1,610	1903	1,688	1,270	78.89
1907-11	2,123	1911	2,493	1,585	74.67

GAMBIA

1897-1901	283	1898	328	204	72.07
1902-6	354	1906	404.5	226	63.84
1907-11	471	1910	507	311	66.25

ZANZIBAR. Av. tonnage of ocean-going vessels entered and cleared at the Port of Zanzibar

1897-1901	601	1900	697	188	31
1902-6	867	1904	950	267	30.7
1907-11	1,101	1911	1,421	337.5	30

MAURITIUS

1897-1901	692	1901	799	470	67.92
1902-6	782	1906	815	545	69.69
1907-11	824	1910	986	600	72.83

SEYCHELLES ISLANDS

1897-1901	224	1901	338	163	72.78
1902-6	249	1903	274	108	43.35
1907-11	322	1911	413	98	30.43

S. NIGERIA. The total av. net tonnage entered and cleared, 1907-11, exclu. of coasting trade, amounted to 1,520,000 (1911, 1,610,700), of which 62.1 % or 945,000 tons was British.

RAILWAYS

	<i>Miles open for traffic, end of 1912.</i>	<i>Av. receipts. 1907-11 £1,000.</i>	<i>Receipts. 1911 £1,000.</i>	<i>Av. expend. 1907-11 £1,000.</i>	<i>Expend. 1911 £1,000.</i>	<i>Ratio av. expend. to av. receipts. %</i>
Rhodesia Gov.	1,397 ¹	691	998.6	337	380	48.76
Rhodesia Priv.	959 ²	432	744	192	252	44.44
Nyasaland Priv.	113	—	26	—	10.5	39.72
Uganda Gov.	55	—	(12) 8.1	—	(12) 6.9	61.7
E. Africa Protect. Gov.	586	274	360	189	228.8	68.98
N. Nigeria Gov.	445	(10-11) 29.5	44	(10-11) 39.9	61	135.2
S. Nigeria Gov.	467 ³	210	307	129	177	61.44
Gold Coast Gov.	222	208	286	82	102	39.42
Sierra Leone Gov.	271 ⁴	86.6	108	78.4	79.8	90.53
Zanzibar Private	6½	(8-11) 4.15	4.04	4.19	3.54	100.9
Mauritius Gov.	130	153	160	112	107.5	71.2

¹ Inclu. 394 m. in Bechuanaland and 112 in the Cape of Good Hope.

² Inclu. 204 m. in Portuguese E. Africa.

³ Inclu. 267 m. in N. Nigeria.

⁴ Inclu. tramline connected with railway.

LIVE STOCK

	<i>Horses.</i>	<i>Horned Cattle.</i>	<i>Sheep.</i>	<i>Pigs.</i>
Swaziland (Census 1911)	541	57,600	163,600 ¹	9,000
Basutoland (Census 1911)	88,000	437,400	1,369,000	—
Bechuanaland (Census 1911)	1,632	323,900	358,300 ¹	—
Rhodesia (Census 1911)	20,445 ²	500,600	300,000	1,800
Nyasaland (1911)	266 ²	60,000	22,000	18,600
Uganda (av. 1907-11)	11	483,600	587,000	600
E. Africa Protect. (1911)	950	775,000	6,500,000	3,000
St. Helena (Census 1911)	152	1,271	4,446	280
Sierra Leone (av. 1906-10)	38	1,280	630	90
Gambia (1907)	3,851	82,780	—	—
Mauritius ³ (av. 1907-11)	630	14,120	1,280	4,400
Seychelles (approx.)	150	1,000	200	5,800

¹ And goats.

² And mules.

³ On sugar estates.

EGYPT

Area (administrative divisions).—12,020 sq. m., i.e. 10 % of that of the U.K.

Agriculture.—Av. 1909-10—1911-12. Area under various crops (in 1,000 acres): maize, 1,884 (23.75 % of total); cotton, 1,756 (22.13 %); forage, 1,704 (21.49 %); corn, 1,305 (16.44 %); beans, 560.2 (7.07 %); barley, 388.2 (4.89 %); rice, 256.0 (3.22 %); sugar cane, 50.0 (0.63 %); orchards and kitchen gardens, 30.6 (0.38 %). Total, 7,934,000 acres.

Av. product. of cotton (1907-8—1911-12) 673.2 million lb. (1911-12, 735.4 millions). Av. product. of sugar (1907-8—1911-12) 53,000 tons (1911-12, 57,880).

Minerals.—Gold production, av. 1906-10, £16,700. Salt production, 100,000 tons per annum, average exports, 1907-10, £11,000.

Railways.—Total length of State Railway, 1,480 miles. Average receipts 1907-11, passengers, £1,724,000; goods, £1,797,000; miscellaneous, £39,000. Total, £3,560,000 (1911, £3,787,300). Average expenses, £2,055,000 (1911, £2,083,700). Ratio working expenses to gross receipts, 58 %.

Shipping.—Total net tonnage passing through the Suez Canal. Av. 1907-11: British, 9,915,400 tons (62.99 % of total, 1911, 11,715,000 tons ;

German, 2,457,000 tons (15·61 %), 1911, 2,792,000 tons; French, 815,400 tons (5·18 %), 1911, 824,000 tons. Total, 15,740,000 tons, 1911, 18,326,000 tons.

Tonnage of vessels entering and clearing at Alexandria, av. 1907-11, 7,067,000.

Imports and exports (av. 1902-6).—*Imports*, £26,772,000 (merchandise 20 mill., bullion and specie 6·7 mill.). Av. 1907-11, £33,535,000 (merchandise 25·5 mill., bullion and specie 8 mill.). *Exports* (domestic products), av. 1902-6, 23·8 mill. (merchandise, 21·3, bullion and specie, 2·5 mill.). Av. 1907-11, 33·5 mill. (merchandise 27·3 mill., bullion and specie, 6·2 mill.).

Principal articles imp. and exp. (av. 1907-11, £1,000). *Imports*: cotton manu., 3,493 (13·7 % of total merchandise imp.) 1911, 4,233; flour, 1,564 (6·12 %), 1911, 1,640; coal, 1,334 (5·23 %), 1911, 1,346; iron and steel manu., 1,314 (5·15 %), 1911, 1,360; wood for building, 1,261 (4·82 %), 1911, 1,186; tobacco, 979 (3·73 %), 1911, 1,220. *Exports*: cotton, 22,426 (82·17 % of total exp. of merchandise), H. Y. 1910, 24,848; cotton seed, 2,597 (9·52), 1911, 2,214. Other exp., tobacco, 289 (1·06 %); oilcake, 268 (0·98 %); onions, 246 (0·9 %); rice, 209 (0·76 %).

Trade with principal countries (av. 1907-11) in £1,000. *Imports* (merchandise): U.K., 8,295 (32·54 % of total); France, 3,016 (11·83 %); Turkey, 2,977 (11·68 %); Aust.-Hung., 1,798 (7·05 %); Germany, 1,312 (5·14 %); Italy, 1,266 (4·97 %); Brit. E. Ind., 1,049 (4·11 %); Total imp., 25,493. *Exports* (merchandise): U. K., 13,931 (51·06 % of total); Germany, 2,625 (9·62 %); France, 2,223 (8·15 %); U. States (1908-11), 1,796 (6·58 %); Russia, 1,629 (5·97 %); Aust.-Hung., 1,132 (4·15 %); Switzerland, 921 (3·37 %). Total exports, 27,282.

Population.—Estimated 1901, 10,238,000; census 1907, 11,287,359; estimated 1911, 11,975,000; per square mile (1907), 939; sexes (1907) 1,008 men per 1,000 women.

Revenue and expenditure (av. of five years, 1907-11, in £1,000).—*Revenue*: Land taxes, 5,151 (30·37 % of total); State railway, 3,589 (20·15 %); customs (exclu. tobac.), 2,057 (12·13 %); tobacco, 1,693 (9·98 %); other receipts, 4,472 (26·37 %); total av. rev., 16,962. *Expenditure*: Public debt, 4,027 (22·34 % of total); public works, 3,027 (16·79 %); railway, 2,934 (16·28 %); Min. of Interior, 1,171 (6·49 %); other expenses, 6,871 (38·10 %); total av. expenditure, 18,030. Public Debt (av. 1907-11), £95,236,000; 1911, 94·62 mill.

ANGLO-EGYPTIAN SUDAN

Area.—984,520 sq. m. or 8·1 times the area of the U. K.

Agriculture.—Av. acreage under crops, 1908-12, 1,790,000 (1912, 2,015,000 ac.).

Railways.—Line open 1,500 m. Av. gross rev., 1908-11, £409,500 (1912, £522,300); working exp., £301,200 (1912, £385,200); av. profits, £108,300 (1912, £137,000); av. percentage of expend. to earnings, 73·5.

Imports and Exports (in £1,000).—Av. imp., 1908-11, 2,044 (1911, 2,331); cotton goods, 512 (1911, 595·2). Av. exp., 1908-11, 950 (1911, 1,411); gum, 335 (1911, 446·5); cotton, 237 (1911, 244).

Trade with principal countries (av. 1910-11, £1,000).—*Imports*: Egypt, 910 (42·24 % of total); U. K., 714 (33·16 %); India and Aden, 135 (6·28 %); Australia, 127 (5·6 %); Germany, 21·5 (1 %); France, 14·86 (0·69 %); other countries, 232·1 (11·03 %). *Exports*: Egypt, 716·5 (59·39 % of total); U. K., 167·3 (13·48 %); France, 98·9 (8·2 %); Germany, 69·2 (5·73 %); U. States, 41·5 (3·35 %); other countries, 113 (9·4 %).

Revenue and expenditure.—*Revenue* (collected in the Sudan): Av. 1908-12, in £1,000, 1,205. Highest Year 1912, 1,410 (1902, 276·75). Principal sources of rev.: railways (av. 1909-12), 428 (1912, 518); steamers, 158 (1912, 186); land tax, 130·8 (1912, 145); customs, 84 (1912, 96); post and telegraph, 56·6 (1912, 63·6). *Expenditure* (av. 1908-12): 1,316 (1912, 1,576).

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